The Journal of
SOCIAL ISSUES
1961 XVII No. 4

Trigger for Community Conflict:
The Case of Fluoridation

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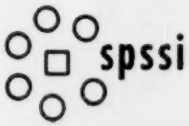

XVII 1961 No. 4

THE JOURNAL OF SOCIAL ISSUES

Published Quarterly by

The SOCIETY FOR THE PSYCHOLOGICAL STUDY OF SOCIAL ISSUES

A Division of
THE AMERICAN PSYCHOLOGICAL ASSOCIATION
Annual Subscription: $4.00 Single Copy $1.50

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The Journal typically publishes a whole number on a single topic. An occasional number will be devoted to contributed papers relevant to the purpose of the Journal. Proposals for new issues and individual papers should be sent to the General Editor.

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Fluoridation and the Social Scientist: A Review

Benjamin D. Paul

The current controversy over fluoridation is the spectacular and unexpected by-product of a remarkable health measure introduced more than ten years ago. Seldom has there been a measure to protect the public's health which has been so effective, so certain, and so simple. And yet, curiously enough, seldom has a program for safeguarding health evoked an outcry so vehement, so sustained, and so successful in blocking action. As a prelude to the other papers in this special number of the Journal, the present article supplies a factual and historical backdrop of the fluoridation issue and a summary of the social science research relating to it.

Origins of Fluoridation

The effectiveness of fluorine in reducing the incidence of tooth decay was discovered by chance. This interesting history, a classic case of the ways of scientific discovery, is reviewed at length by McNeil (1957) and summarized by Green (1958). A search begun at the turn of the century eventually found excessive fluorine to be the agent responsible for the mottling of teeth in certain regions of Colorado and other western states. In areas where the fluorine content of the water supply was abnormally high, teeth not only tended to be discolored but, also, it was noted, relatively free from decay.

This observation led, in the late thirties, to an epidemiological study of 21 cities which revealed a systematic inverse relationship between the amount of fluoride in the water and the amount of dental decay. The optimum concentration was shown to fall somewhere between 0.7 and 1.5 ppm (parts per million) depending on average temperature and other conditions. With concentration well above 1.5 ppm, brown discoloration (a cosmetic rather than a health hazard) begins to appear. Like iodine and other trace elements essential to good health, either an excess or a deficiency of fluorine is undesirable.

The U.S. Public Health Service, having studied the matter for

several years, by 1944 satisfied itself that no toxic effects would accompany the introduction into local water supplies of enough fluoride to raise the concentration to 1 ppm, and decided to encourage controlled field studies of artificial fluoridation. The following year, fluoridation began in Newburgh, New York, with nearby Kingston serving as a control community; and in Grand Rapids, Michigan, with Muskegon as the control. From the point of view of the Public Health Service, these field trials were only exploratory and not expected to show definitive results which would warrant wide-scale application for ten or fifteen years. But within five years, so impressive were the results and so insistent were the demands for a statement of approval (particularly from the State Dental Society of Wisconsin, where 50 communities had begun or approved fluoridation by the end of 1949), that the Public Health Service decided to announce a new policy. Late in 1950 it strongly encouraged communities which desired to fluoridate their communal water supplies to do so. In quick order, public endorsements were made by other professional organizations: The American Dental Association, the American Association of Public Health Dentists, the National Research Council, the American Medical Association, and others.

The stand of the A.M.A., especially crucial in the light of criticism stressing the possible non-dental toxic effects of fluoridation, was strongly affirmed in 1957 and reaffirmed by the executive vice-president in 1961. Critics of fluoridation apparently have not been able to persuade any regular scientific organization to disapprove the measure or to disavow an earlier endorsement.

Rarely has a health measure been so carefully studied. In communities with fluorine-deficient water (most U.S. communities are in this category), the caries rate drops 50-65 per cent as children grow up on fluoridated water. Arguments to the effect that the experiment is inconclusive and that long-delayed side effects will become manifest in due time, apparently lack scientific merit. Introduced fluorine is chemically identical to fluorine naturally present in the water supply; no evidence of harmful side effects has been found in people living out their lives in fluorine-rich areas of the United States, despite exhaustive medical examinations and careful comparisons of morbidity and mortality rates. Elemental fluorine is found in its free form neither in nature nor in fluoridated water; it naturally occurs combined with other elements in simple inorganic salts known as fluorides, of which the commonest are calcium fluoride and sodium aluminum fluoride.

Adding fluorides in the proper proportion presents no technical problem to sanitary engineers or water superintendents; the recommended dosage can be regulated and monitored without difficulty. The cost of adding fluoride is nominal—ten or twenty cents per person per year. Opponents have challenged fluoridation in the courts on the

ground that it violates constitutional rights and on other grounds, but higher courts have generally sustained the right of a municipality to enact fluoridation. In the course of this writing, for instance, Chicago seems on the verge of winning a five-year legal battle over the city's right to continue fluoridation. The Master in Chancery of the Superior Court recently completed a report recommending that the judge dismiss an injunction suit against the city filed in 1956 by four opponents who claimed that fluoridation constituted compulsory medication in violation of their rights and that long-term effects were dangerous to health.

One might suppose that dentists would feel ambivalent about a measure that markedly reduces dental decay, fearing their material interests threatened, but this is not the case. Studies have failed to elicit evidence of such misgivings; on the contrary, dentists overwhelmingly favor fluoridation. Nor is there an objective basis for concern. Despite the great number (about 80,000) of practicing dentists in the United States, less than one-third of the dental needs of the nation receive attention; and yet the civilian population annually spends over one and one-half billion dollars on the care of its teeth,[1] an amount representing over 15% of expenditures for all types of medical care, insurance, drugs, hospitalization, etc., according to experts in the field (Sognnaes and Shaw, 1958). The chief dental officer of the U.S. Public Health Service asserts that over 97 million people in the United States have decayed teeth requiring treatment and that over 21 million others have lost all their teeth (J. Knutson, 1960). Sognnaes and Shaw write: "When the universality and enormity of these disease problems are contemplated, the need for earlier preventive measures, both for individual and mass application, becomes clearly evident (p. 305). . . . Water fluoridation is of the foremost importance today in the prevention of dental disease from a public health standpoint (pp. 317-318)."

The Present Situation

And yet, despite the magnitude of the dental problem and the demonstrated capacity of fluoridation to attack it so successfully, safely and economically, efforts to promote the measure have encountered remarkable opposition. Vocal antagonists arose from the beginning, some preempting a place of national importance as they issued tracts and rushed from one locality to another to fight the danger they saw in fluoridation. While disconcerting to the official proponents who had taken such care to establish their case, this opposition was not wholly unexpected; the history of other public health

[1] Still more recent estimates raise dental expenditures to $2.4 billion (*Progress in Health Services*, 1960).

measures now commonly accepted as indispensable shows that opposition appeared when vaccination, pasteurization and chlorination were first put into effect. To be sure, these earlier measures, in contrast to fluoridation, were directed against communicable diseases. Nevertheless, it was confidently expected in many quarters that resistance would abate, that the cries of alarm would cease to frighten, and that the evidence of better teeth among children living in fluoridating communities would dispel any doubts remaining in the minds of the hesitant. But this has not proved to be the trend.

Fluoridation has been abroad in the land for over a decade and the pace of community acceptance has slackened rather than accelerated. From a total of 95 communities with about 1,500,000 people at the end of 1950, the number of communities adding fluoride to the water grew to about 1500 with some 31,000,000 people by the end of 1956. During the four following years, the rate of increase slowed noticeably. The total was about 2000 communities with a population of 38,000,000 at the time the Surgeon General of the Public Health Service addressed an American Dental Association conference in April, 1961 (Terry, 1961). This would indicate an average annual increment of some 120 communities since 1956, as compared to an average increment twice as high for the preceding years, and 378 communities for the peak year of 1953. Surgeon General Terry said it was "nothing short of a tragedy" that only a third of the country's urban population receives community protection against dental caries. Fluoridation, he asserted, "is beyond question the most effective, the most economical means available for the prevention of dental caries" (Terry, 1961).

Communities reach decisions on fluoridation by executive action, by referendum or, in parts of New England, by town meeting. Until recently fluoridation was defeated in about two-thirds of the local referenda held throughout the nation, but more lately, in 56 referenda in November 1960, for example, the cause was lost 43 times (77%). Of course the present faltering pace of the fluoridation movement may prove to be only a transitory phenomenon when seen in retrospect from the vantage point of the future. But whether or not this turns out to be true, it is abundantly clear that opposition to a technically sound measure designed to improve health without altering the balance of economic interests, amounts to something more than a murmur of dissent and invites carefully designed studies intended to augment our general knowledge of the social process and to help guide the nation's leaders in the determination of public policy.

Arguments of the Opposition

The case for fluoridation is straightforward: it combats the most prevalent of all diseases at little cost and inconvenience and without

hazard to bodily health. The arguments leveled against it fall mainly into three categories: its benefits are uncertain; it may have injurious consequences; it violates individual rights.

The first argument seems to be the least effective. Its persuasive force steadily diminishes as favorable results of fluoridation are reported from one community after another. Nevertheless the evidence is more meaningful to statisticians than to laymen, who are relatively insensitive to quantitative documentation. Moreover, neither the magnitude of the caries problem nor the prospect of reducing it makes much impression on a public which does not regard tooth decay very seriously. It has been pointed out that dental decay, while costly, painful and disfiguring, is neither contagious, deadly nor dramatic (J. Knutson, 1960).

The second argument, the possibility of poisoning, is more persuasive because it appeals to the emotions and invokes anxieties, and because its refutation involves technical information (e.g., the concept of optimal quantity, or the identity of natural and introduced fluorides). Furthermore refutation of the poison argument rests on negative rather than positive evidence. A claim that fluoridation causes kidney or bone damage, for instance, is denied on the grounds that such effects have not been detected despite search; but this does not completely rule out the possibility, however remote, that damage may yet be discovered in the future. Different people demand different degrees of probability (including the unobtainable degree called "certainty") before they decide to act. It takes only a small amount of doubt about the safety of fluoridation to tip the scales against taking a chance if there is little counter-balancing concern about dental decay.

But perhaps the most potent of the three common lines of argument used by the opposition is the charge that fluoridating the public water supply infringes the rights of individuals, who are not free under this form of "compulsory medication" to choose whether or not to consume extra quantities of fluoride. The argument rests on a value assumption and thus falls beyond the realm of proof or disproof. It is probably this particular argument which is responsible for much of the heat generated in local fluoridation campaigns. Interestingly enough, a lukewarm concern about the problem of dental decay is often accompanied by red hot indignation about the measure designed to control it.

The nature of the arguments against fluoridation poses questions of public policy. One such question concerns the proper role of government. To what extent and under what circumstances should public authorities provide health benefits to its citizens where no communicable disease is involved? Improving mutual understanding between the layman and the scientist (and the professional who applies the findings of the scientist) is another issue. Here the more specific

questions are these: how can mutual education best be achieved, and how much of a difference will this really make? Still another issue is that of direct versus representative democracy in a technically complex world. When and how should the public decide? When is it good policy to let the public rather than its political or technical representatives (e.g., councilmen or public health officers) pass on measures whose assessment requires scientific judgment?

If fluoridation is seen simply as a preventive health measure to reduce the incidence of dental caries, it may well seem of limited importance as a social issue. Yet, a fluoridation proposal frequently becomes a focus for dramatic social conflicts. Tensions which may have their source in industrialization, the growth of big government and big business, and the anxieties of the nuclear age, are triggered by this seemingly innocent issue. In short, there is much for social research to explain in the extraordinary actions often surrounding this complex controversy.

Social Science Research

By itself, scientific research cannot certify or discredit value judgments, nor can it determine what public policy should be, but science can supply knowledge that is useful in making wise decisions and forming effective policy. Scientific inquiry succeeded in isolating fluorine as the element providing resistance against dental decay; social research is now trying to identify what sways individuals and communities to resist fluoridation or to favor it. Although the reasons are presumably determinate, there is little hope that a simple explanation will be discovered comparable to the simplicity of the causal chemical agent. From the factors already identified, it is clear that the explanation for individual and group behavior in regard to fluoridation will be complex and that the determinants of attitudes and decisions will vary according to different categories of persons and different community circumstances. In fact it is a first order of business for social investigators to establish useful distinctions of this order.

The prelude to social science research on fluoridation consisted of descriptive accounts of controversies in particular communities, usually those ending in defeat. Such accounts first appeared in 1953 when Burns and Hutchison separately published reports on the fluoridation battle in the college town of Williamstown, Mass. Many other accounts have become available since then. The first systematic study, as distinguished from a case history, was a report on an opinion poll of respondents in Northampton, Massachusetts, by the Mausners (1955). Similar studies conducted in other towns have since appeared.

In recent years, the problem of fluoridation acceptance has been studied from a variety of standpoints but only a fraction of the

findings has appeared in print as yet. The research possibilities are manifold and intriguing. The fight for fluoridation now in progress offers social scientists a series of "natural" experiments in mass persuasion and community decision-making which cannot be duplicated in the laboratory. Moreover, the salience of this particular issue to members of the health professions provides an excellent opportunity to promote collaboration between health practitioners and social researchers. In the light of these potentialities, the number of centers (four or five at most) sponsoring research on the social and psychological aspects of fluoridation is surprisingly small. The articles that follow, none previously published, well represent the range of research efforts recently concluded or now in progress.

The Papers in this Number

Of the articles that follow, the first three deal with the characteristics distinguishing individuals who oppose fluoridation from those who favor it. Insofar as the aim is to explain the motivational basis for the behavior of individuals, these articles, as opposed to those that follow, are "psychological." The approach is different in each case, as might be expected from the fact that the authors are an anthropologist, a sociologist, and a pair of psychologists, respectively. For both opponents and proponents a distinction must be made between leaders and followers, that is, between people who become active in the local campaign and people who simply vote yea or nay. The motives of these groups differ.

Green's paper is concerned not with ordinary voters but with townsmen who lead the fight against fluoridation. Unlike some of the nationally prominent opponents of fluoridation who combine passion with a measure of opportunism, local opponents tend to be earnest and sincere. Green produces evidence, including graphic quotations from his field notes, to support a number of contentions: that indignation over the presumed violation of personal freedom is more fundamental, in the minds of his informants, than the danger of poisoning; that the fear of poisoning symbolizes a disposition to see fluoridation as an insidious attack by a vague constellation of impersonal social forces bent on usurping the powers and the prerogatives of the common citizen; and that the root cause of this feeling of being victimized, sensed by active opponents of fluoridation, is the increasing remoteness and impersonality of the sources of power and influence affecting the daily life of the individual.

Citizens who vote against fluoridation, unlike active opponents, do not seem to be unduly exercised about loss of individual freedom. One study of voters in Cambridge, Massachusetts, did, however, show that people voting against the measure, as compared to those

voting for it, in general felt more powerless, that is, less able to influence political action in the world around them (Gamson, 1961b). Simmel too found such a tendency, as his article in this number of the *Journal* indicates. However, Simmel sees political helplessness as only one of four types of sensed deprivation, and marshals statistical evidence to buttress his claim. Like Green, he seeks to explain individual attitudes and behaviors in terms of the sociological conditions that activate these attitudes and behaviors. Persons who feel deprived, he reasons, tend to register their resentment against society by voting against fluoridation.

Of course, if Simmel's thesis is correct, those sectors of society which feel themselves disadvantaged should vote negatively, if they vote at all, on issues other than fluoridation when these are put to a popular vote. And indeed a study of voters in two upstate New York referenda on school board proposals shows a consistent pattern of negative voting among the socially and economically deprived segments of the population, an action interpreted as an expression of political protest by the powerless and ordinarily apathetic members of the community (Horton and Thompson, 1960). How the pattern of victories and defeats in the matter of local referenda on fluoridation differs, if at all, from the pattern in other types of referenda, is a subject meriting more study.

The paper by Kirscht and Knutson tests the proposition advanced by some investigators, that rejection of fluoridation is a particular manifestation of a generalized hostility to science and its effects on society. The authors find that over four out of five people regard the world as better off because of science. Those opposing fluoridation, like those favoring it, share a generally positive evaluation of science, although the former are not quite as positive as the latter. Many who value science nevertheless feel uneasy about its indirect effects (e.g., production of deadlier weapons, weakening of spiritual values), and this uncertainty is more characteristic of persons who oppose rather than support fluoridation. In sum, while there is no warrant for equating opposition to fluoridation with a so-called anti-scientific attitude, indications are that rejection of the measure tends to correlate with greater ambivalence toward science and its by-products.

It should be borne in mind that features distinguishing pro and anti voters are tendencies and matters of degree. Because of the different numbers involved, it is easier to specify a population with a given characteristic and predict how that group will vote on fluoridation than it is to take all those who vote for or against it and identify the characteristics distinguishing that group. Thus one could specify such categories as Christian Scientists, or people who devalue science or feel socially dispossessed or share a "naturalistic attitude syndrome"

(M. Davis, 1959-60), and predict that they will line up overwhelmingly against fluoridation. But all these special groups combined may comprise only the smaller part of the total that registers dissent in a local referendum on the issue. This does not mean that the search for personality types and categories of persons disposed to vote against fluoridation should be abandoned. It does mean that the research needs to be widened to include an analysis of situational variables in addition to personality or demographic variables. Results of successive votes on fluoridation in the same community have differed widely, and it is clear that such short-run variations must be ascribed to differences in the nature of the campaign and other situational features.

One important aspect of a community campaign is the role played by the issue leaders, a topic treated in Raulet's paper. In one sense this paper complements Green's essay. The latter concerns the active opponents; Raulet's concerns the active proponents. But the mode of treatment differs. Raulet is interested not so much in motivational analysis as he is in role analysis. He observed the progress of two campaigns led by dentists, physicians and public health officers. Ironically, these health professionals, naive in the ways of power and propaganda, tended to defeat their own purposes. They were caught in the dilemma of conflicting role expectations. In choosing to spurn the politically partisan role and to accent the detached professional role they seemingly confirmed opponents' charges of being undemocratic and conspiratorial.

A campaign has a time as well as a role dimension. A scheme for classifying and identifying the temporal stages through which a controversial community issue passes is the subject of Sanders' contribution. The merit of this six-part sequence beginning with the initiation stage and concluding with an aftermath stage is that it facilitates cross-community and cross-issue comparisons and helps the research worker to put in order the multitude of forces at play during a campaign. As Sanders states, certain events, such as the appearance of open opposition or summoning assistance from the outside, typically occur during given stages.

In their essay in this issue, Gamson and Irons compare and analyze four sets of data correlating the results of fluoridation outcome with demographic and other characteristics of the communities involved. National statistics indicate that the proportion of communities fluoridating their water varies with size; most of the very large cities in the United States have instituted the measure but only a small fraction of the smallest towns have done so. However, this correlation apparently reflects only a greater tendency for larger communities to bring fluoridation to the point of decision. Once the

issue is posed, the outcome seems to be independent of size, although the vote tends to become closer as population size increases.

In addition to size, Gamson and Irons examine the association between outcome and age, education, income, rate of population growth and political affiliation. Amount of education seems to show an interesting relationship: towns of either high or low median education seem slightly more likely to take favorable action on fluoridation than those that are in-between. This fits nicely with data on individual voters which suggest that those with high school education may be more likely to oppose fluoridation than are those with college or only grade school education. By itself, age seems to be a better indicator than income. The highest multiple correlation using two variables combines percent of people with incomes under $2000 and percent of population over 65 years of age, but even this correlation with vote on fluoridation scarcely accounts for 15% of the variance. Once again it seems that the quest for diagnostic attributes of a fixed nature, whether of communities or of personalities, is approaching a point of diminishing return, and that the course of wisdom lies in directing systematic research attention to the flow of events in a series of particular campaigns.

It is typical of research that it raises as many questions as it answers. The research on fluoridation is no exception, as Kegeles indicates in the concluding article by enumerating some of the gaps in our existing knowledge, as well as some of the studies now in progress on the social and psychological aspects of fluoridation. His article also discusses the extent to which the research findings reported in this issue of the *Journal* offer guidelines for action, even though the research was not undertaken with this purpose primarily in mind.

NOTE

The bibliography that follows contains virtually all known research items dealing with social science aspects of fluoridation. Most of these sources have been annotated (Gamson and Lindberg, 1961) and their contents reviewed (Gamson, 1961c) elsewhere.

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The Ideology of Anti-Fluoridation Leaders

Arnold L. Green

The most striking aspect of efforts to implement fluoridation is the impassioned opposition that is aroused: what began as a technically conceived and rationally considered public health measure has been transformed into the subject of bitter local disputes throughout the country. Any explanation of the sources of this perplexing development must begin with a consideration of the characteristics of anti-fluoridation leaders, for it is the intensity of their objections that makes the dispute occur at all. In this discussion, we will be solely concerned with those who take active, public roles against fluoridation; the aim is to specify why they are so deeply engaged by this particular issue.

The terms "manifest" and "latent" are among the most used and useful in the vocabulary of social science. Comprehending a range of related distinctions, they mark the difference between the perceptions of the actor and the interpretations of the observer, between the overtly expressed and the covertly implied, between expected ends and actual consequences. Most generally, they link parts to wholes, isolated instances to more complex ensembles: a manifest given is understood by tracing out its relations to its latent context. Following this method of analysis, I will take the accusation that fluoridated water may be dangerous to ingest as the invariant manifest feature of opposition to fluoridation, and will attempt to show that it is located within a determinate latent belief system.

The dangers detected in fluoridation by its opponents vary in urgency, running from assertions that it may only injure some people—the aged or those with certain illnesses—to blanket statements that all users of the water system would be imperiled, perhaps with minor discomforts, such as skin rashes, perhaps with serious internal damage. All such charges warn of some form of poisoning and, for convenience, the term "the poison argument" will be used to refer to them. Taken literally, the poison argument presents an appraisal of the scientific status of fluoridation, and specifies its risks as matters of fact. In contrast to this manifest meaning, the poison argument may also be taken

as symbolic, that is, as an expressive utterance, summing up a diffuse set of latent beliefs and feelings in a concrete image.

The Meaning of Poisoning

Before conducting the interviews on which this paper is based, the following thematic analysis of poisoning was proposed: poisoning involves an agent with malicious intent and a victim. The poisoner relies on deception: the success of the act entirely depends on how persuasively the poison is disguised as something harmless or even desirable. The effect of poisoning is to put the victim under the control of his assailant; with slow poisoning, as fluoridation is almost always characterized, the process is prolonged and, as the poison accumulates, the victim becomes increasingly weakened and helpless.

An element of cognitive failure, of inadequate apprehension, is also implied: there is a troubled sense of something gone wrong, but the victim is unable to specify the danger or locate its source. A hypothesis about anti-fluoridation leaders was derived from this interpretation of poisoning: *People most sensitive and responsive to the poison symbolism feel that in some other crucial areas of life, their autonomy and integrity as individuals are under severe attack. They sense something conspiratorial in the assault upon them.*

The hypothesis was given specific content by predicting that the concerns symbolized in the poison argument could be traced to apprehensions about the social order. The interviews with anti-fluoridation leaders attempted to test the plausibility of this interpretation. Accordingly, the informants were questioned to determine whether, in addition to urging the poison argument, they shared other objections to fluoridation that were derived from a set of general beliefs about American society.

To put the argument of this paper briefly, the fluoridation controversy is animated by the ideological concerns of anti-fluoridation leaders. That is, the opponents of fluoridation are troubled above all by what the measure means, and only secondarily by what, as a scientific or practical matter, fluoridation is. To them, the issue is moral, a direct confrontation with threatening forces that illuminates and sharpens their sense that the society in which they live is radically out of shape.

To designate the anti-fluoridation position as ideological is to denote its fundamentally moral grounds for, as defined here, an ideology recommends or repudiates specific social forms in terms of general social values. The rhetoric employed against fluoridation, as this paper will try to demonstrate, makes it apparent that ideological concerns are predominant: quite independently of the charge that

fluoridation is unnecessary or unsafe, it is condemned as being wrong in principle and morally abhorrent.

Since ideologies make moral assertions about choices of action by arraigning social forms against social values, ideological controversy contains both cognitive and normative elements.[1] The parties to an ideological dispute may differ either over their identification of the problem posed for choice, or over the values that are most relevant to the decision, or both. Taking the rejection of fluoridation as an ideological directive, the components may be distinguished as follows: the directive may follow from a cognitive belief that it is misleading and mistaken to describe fluoridation as a public health measure; or it may follow from an evaluative judgment that while fluoridation is a public health measure designed to meet a public health problem, it is prohibited by values that forbid its implementation; or, both considerations may sustain the conclusion that fluoridation should be rejected.

The weighting of cognitive and evaluative elements can only be determined by examining the justification that is offered for condemning fluoridation. It is highly probable that the justifications for ideological assertions are typically only partly explicit. They must be constructed by pressing informants to explain why they have taken a particular stand on a particular issue: to move, in other words, from manifest convictions to latent justifications.

From the reasons they gave in their interviews, anti-fluoridation leaders differ most drastically from advocates of the program in their cognitive beliefs about fluoridation. They identify fluoridation in terms of their beliefs about its actual purposes. It is not, they hold, a genuine attempt to improve public health, but is something else. This is not simply to say that anti-fluoridation leaders accept and propagate the poison argument, and so describe fluoridation as a health menace. As will be shown, the poison argument is not the dominant objection to fluoridation. Some anti-fluoridationists are, in the privacy of the interview situation, doubtful about it, however much their belief may reappear when they return to public controversy. They are, though, highly intrigued by the poison argument and find it quite plausible. It is this plausibility that must be explained and a further consideration of the poison argument is thus required.

The poison argument states that the introduction of fluoride into the water supply will cause organic damage, from minor discomforts to severe physical insult, and possibly even death. Given this manifest meaning, it is quite understandable that the fluoridation controversy is pitched in such a high key, and conceivable that it could involve

[1] See Ladd (1957, pp. 148-166) for a discussion of "validation" and "justification" as aspects of ethical systems; and particularly, his argument that any moral directive for conduct can be considered as the conclusion of an argument that subsumes a statement of fact under a moral premise.

actual violence, for, in these terms, the dispute is between those who are attempting to protect themselves from poisonous assault, and those who are seen as the assailants. Literally, the poison argument implies that one of the most stable expectations of social life—that an individual will not be subject to wanton and unprovoked physical attack—has collapsed.

As indicated earlier, the interpretation taken here is that the poison argument is best understood symbolically. To be more specific, its plausibility is derived from its metaphorical function: "The principle of metaphor is simply the principle of saying one thing and meaning another . . . [A metaphor] is an idea expressed by language, an idea that in its turn functions as a symbol to express something . . . . It formulates a new conception for our direct imaginative grasp" (Langer, 1957, p. 23). The poison argument expresses a set of diffuse but intense ideological apprehensions. The threatening themes of poisoning—deception, loss of control, debility—correspond to themes found in an image of American society.

Image of an Alien Society

The image may be summarily described as follows: There are profound contradictions between fundamental American values and the current condition of American society. Power is dangerously concentrated in distant centers, and enriches itself through the exercise of coercive authority, hidden behind a baffling screen of vast government bureaucracies and giant corporations. Deception has become a practiced art in public affairs: actual motives are rarely revealed by professed reasons. The individual is increasingly manipulated, and the scope of his initiative steadily contracts; the process is moving to an end that will find most men totally dependent on impersonal agencies.

Assuming, for the sake of the argument, that anti-fluoridation leaders do share such an image of American society, it can be seen why they are so desperately serious about the issue, and so attracted to the poison argument. Quite fortuitously, fluoridation presents a condensed cluster of threats.

Fluorides are necessarily administered to all users of a water supply: therefore it is compulsory, depriving the individual of the most intimate right to choose what he will ingest into his body. The advocates of fluoridation do not claim that it will end dental decay, at worst a minor health problem; and further, fluorides are potentially poisonous: therefore there must be disguised motives for initiating a program that is neither urgently necessary nor entirely safe. A government agency developed fluoridation and presently sponsors it, while the chemicals and equipment are manufactured by large cor-

porations: both are seeking to extend their power, whatever the risks to health or the violation of personal liberties.

Fluoridation, the poison argument asserts, is cumulatively poisonous: little by little, day by day, it will reduce vigor and strength, and healthy individuals will be made weak and sick. With all the force of a fine metaphor, the poison argument focuses the concerns of anti-fluoridationists in a luminous image, and by naming the fears that inspire their sense of alienation from the society around them it expresses, and perhaps tempers, their tensions.

Interview Results

The results of interviews with 28 anti-fluoridation leaders in six Massachusetts communities serve to illustrate the interpretation which has been outlined above. Since the aim of the research program was to compile a series of brief and exploratory case studies on community experiences with the fluoridation issue, much of the interviewing time was devoted to obtaining accounts of the controversy as it had taken place in the informant's community. The interviews varied widely in length and content and, for six informants, there is no clear explanation of their reasons for opposing fluoridation. These cases will be omitted from the following discussion. The informality of the interviewing procedure should be emphasized: no fixed list of inquiries was followed, and several useful questions were only formulated after a number of interviews had been conducted.[2]

While all the informants were active opponents of fluoridation in their communities, there were other opposition leaders who were not interviewed due to the limited time given to the study of each community. Thus, the material that follows is not drawn from a representative sample of anti-fluoridation leaders in any strict sense. In all 22 of the adequate interviews, some mention was made of the dangers of fluoridation. The reasons ranged from flat assertions that fluorides in any form were poisonous to less specific statements that the method of adding fluorides to water was unreliable and left it possible for the concentration to rise above the proper level.

Objections of the latter form tended to be mild. One man answered a question about the safety of fluoridation by saying: "If you put it in the water supply, it collects in quantities at the end of a pipeline. There are a great many places in this town that are summer places at the end of the line. We had facts—supposed to be facts—that it

[2] Of the 28 informants, 20 were male. Some difficulties encountered in an early interview led us to abandon asking the informant's religion; and a perhaps undue sense of caution about putting personal questions generally resulted in obtaining only limited background information. For details on how the informants were selected and the interviews conducted, see Green (1958, pp. 34-36, 119).

corroded the equipment." He was then asked: "Just how dangerous do you think fluoridation is?" He replied: "In the first place, we didn't think it was necessary. Then again the material has to be put in pretty carefully. It demands pretty constant attention. Suppose some fella at the Water Works gets bunned, and decides, 'Oh, what the hell, I won't put in a bucket, I'll just dump in a couple barrels-full.' When the human element enters in, we thought it was dangerous." Since they were not all asked the same questions, it is impossible to enumerate the varying reasons the informants gave for believing fluoridation to be unsafe. It was, though, clear that in some cases these beliefs were held rather tenuously.

Since the poison argument always appears in fluoridation controversies, it is scarcely startling that, in one form or another, it was invoked as a reason for opposing the program. It is, however, significant that no informant based his stand solely on the grounds that fluoridation was potentially poisonous. In all 22 interviews, some statement was made that, as well as being possibly harmful, fluoridation was objectionable in principle. If the poison argument were primary, it might have been expected that at least some informants would have indicated that if claims for the safety of fluoridation could be substantiated, they would withdraw their objections. That this did not occur is consistent with the proposed explanation that the origins of opposition to fluoridation are ideological.

In eight cases, uncertainties about the safety of fluoridation were secondary to emphatic convictions that the program was morally wrong. (Of the remaining 14 interviews, some differed on this point, and for others, there is not enough evidence to make a judgment.) The following quotations from the interview protocols are cited as examples of the subsidiary position of the poison argument. The interviewer's questions appear in brackets.

> Every effort is made to keep the public from knowing that there is a great deal of disagreement among doctors and dentists. . . . [How do you feel about the poison argument?] My own beef is that it is not a democratic procedure. . . . [Suppose all the experts came to agree that fluoridation was safe, that there wasn't any danger of ill effects in any way. How would you feel then?] I'd still be against it, on the basic principle of democratic procedure.
>
> The method they use is un-American, it invades our constitutional rights. No one has the right to force medicine against our will. If you drink water, you've had it. . . . [Would you change your mind if it was definitely proved scientifically that fluoridation was safe?] I probably wouldn't change my mind even if it were a demonstrated scientific fact.
>
> [Why did you oppose fluoridation?] We didn't think it was neces-

> sary. We got the finest water in the state—everybody knows that. It's got enough fluoridation in it anyway. . . . Mostly it was the principle of forcing something on us which we didn't want. After all, this is a free country and we're not going to have someone forcing us to take something in the drinking water.
>
> [How do you feel about whether it's safe or not?] It's not whether it was safe, it's compulsion. That's what I base it on.

It should be emphasized again that the informants who rejected fluoridation on moral grounds also raised the issue of its safety at other points in the interview, sometimes in apparent contradiction to disavowals that they were really worried by it. And, in their public roles as leaders of anti-fluoridation groups in their communities, these informants were the sources of statements stressing the poison argument in pamphlets, letters to newspapers, or at public meetings.

The salience of moral objections strongly suggests that the anti-fluoridation movement would not disappear even in the unlikely event that its leaders could be persuaded to accept the predominant scientific judgment that the program will reduce dental decay without endangering health. In varying degrees, the opponents are concerned about the possible physical dangers of fluoridation, but they are also troubled by its moral implications and for some this objection in principle is fundamental.

Perceived Motives of the Sponsors

The discussion invariably took on an ideological tone when the informants turned their attention to the sponsors of fluoridation. The United States Public Health Service was most frequently mentioned. As one woman said:

> It's a big feather in any Public Health man's hat to get fluoridation in. There's constant pressure put on to push it through. If the American people knew the millions and billions spent to push it through I don't know how they'd feel.

In a number of cases, both government and business interests were held to be the driving forces. For example, quoting another informant:

> Who makes the stuff? Several chemical companies. It's got to be sold, doesn't it? Who contributes to these research bureaus? It's a by-product of aluminum. We went into the financial records of the Aluminum Company of America, and when they give gifts, what was it for? . . . It looks as if some smart salesman for a chemical company making it sold the idea to the head of the United States Public Health Service.

By following what the informants feel fluoridation means, we can see the immediate issue as a frame for their image of the wider world: Government and business are allied to achieve their separate ends; the one is attempting to extend its domination over the individual, with socialism the ultimate outcome; the other is motivated by the prospect of expanding markets and swelling profits. Some extensive quotations should dissolve the apparent paradox of how socialist seeking government bureaucracies and profit-driven business firms can find common cause in fluoridation.

After saying that commercial interests instigated the Public Health Service to promote fluoridation, one informant continued:

> There's one of the weaknesses of a democracy, that selfish, greedy people, making money for themselves, can get away with it unless someone like ourselves stands up and fights . . . . [Do you think we have lost individual rights in the last few decades?] I think human nature probably hasn't changed at all. I do think that the modern period has let us in for easier control of men's minds—radio and television. We're living in a period when the greedy interests find it easier to put it over. The average man doesn't want to think for himself, so he makes it easier. More care has to be taken to watch those interests that want to be greedy—greedy for power and money at the expense and the health of the nation. This is why the danger of socialism is great today too.

Another informant was especially articulate:

> [How did you first hear of fluoridation?] I have been interested in it by the approach to it in a great many areas of the country. I am not opposed to fluoridation per se. The approach of the proponents has been indirect. There is a nation wide pattern of trying to get it in without anyone knowing. There are always attempts to discredit anyone who questions or challenges it. It is not consonant with democratic procedure . . . . The proponents of it have been in many cases deliberately deceived. [How do you mean, deceived?] It's an open fact that many of the proponents all over the country have attempted to put it over without full information. The PTA has been helpful in this, and so have some of the commercial interests.
>
> [What do you think is the goal of those carrying on the deception?] Sometimes they don't realize it themselves. There is great power and prestige in doing it this way. [What kind of power?] Power to influence people, power to pass legislation, power to corral funds for various activities. Political power is certainly implied. [What other dangers are there like fluoridation?] There are always dangers of that kind. If it doesn't come in one form, it will come in another. [What do you mean by 'that kind of

danger?'] Wherever there is democracy there are going to be attempts to do it better—put that in quotes—because the democratic process is slow. It's manifested by an attempt of government bureaus to do the people's thinking for them, both here and abroad. The citizen has a responsibility to consider issues himself, and not by what others try to get him to decide. It's weakening, it's enervating, and the first thing you know he has let his rights and privileges slip away under the guise of what's good for the majority.

Two saw fluoridation as a sign of other ominous developments:

It's just the beginning of something much bigger to come. There's a trend to that type of thing. Pretty soon they'll have people eating the same sort of thing . . . . You have people who say, 'This is good for you and you have to take it whether you like it or not.' This is a free country and it's got to stay that way.

The trouble with what the government is doing today is that what they advocate, things like fluoridation, makes life too easy for the people. It weakens our moral fiber and permits us no thinking for ourselves. Everything's now coming down from above.

The following passionate and at times confused statements are from an informant who had never taken part in local issues before the fluoridation controversy brought him to the center of community attention:

It's the first form of compulsion, the first step to socialized medicine. Our country as a democracy seems to be against socialized medicine but I don't think we're all against it. . . . [Do you think the government realizes what all this means and is behind it?] How can an individual tell? How can an individual tell? [He then spoke bitterly of an official of the USPHS who had spoken at a meeting in the community, urging it to accept fluoridation.] This incident that happened here was quite a shock. In this country, in the good old USA. Face to face with an overbearing man like him. It gives the feeling of what it's like to be in Russia or Hitler . . . . It isn't a dental problem, but a medical one. That's another thing, the doctors and dentists, that's a business of conforming. They go along. That's why it gets to be a matter of compulsion. [How compulsion?] The world's so big and our lives are getting so complicated. It's an overpowering thing, and rather than understand it, they trust in each other.
[Why don't people see these dangers, especially dentists and doctors?] It's very hard for them to comprehend there could be a danger. It's so tempting . . . . The individual could be swallowed up, could be lost, ridiculed, misunderstood. [Why misunder-

> stood?] I don't think we get a chance to vote or think on something so fundamental. It's not impersonal. This gets down to something awfully basic. When it comes to promote it, there's a tremendous force behind it. I mean people wouldn't think this up all by themselves. You get to the top of any organization and there are a few individuals. In Harvard, anywhere, you're controlled by a certain policy. Once we recognize there's an organization, we ask, 'Do they have the right? Is it constitutional?' . . . We don't want a social order or a military order. Those principles, the military or social, we just didn't grow up on this.

As illustrated by the above verbatim quotations, fluoridation is the focal point of a ramified set of global concerns. The comments that summed up the informants' appraisals of American society did not signal sharp breaks in the interviews: fluoridation was the center from which the discussion departed and to which it continually returned.

The sense of moral urgency pervading the description of the contemporary situation in America is on a grand scale. To opponents of fluoridation, alarming trends are endemic and massive defects apparent. The oppressive authority of government and the calculated exploitation of business are seen as aspects of a persistent process that is continually compressing the boundaries of free choice. Socialist regimentation and ruthless profit making are thus not contradictory but entirely compatible, for both ends merge in a common interest to remove self-reliance and both are served by creating a passive public that will endure manipulation with quiet compliance. This undifferentiated view of economic and political power as two faces of the same fact is particularly evident in the implied meanings of socialism and government. None of the informants interpreted socialism as an attack on the principle of private enterprise. In the contexts where "socialism" appears, it can be replaced by "loss of personal rights" without alteration of meaning. Further, the frequent references to government are always general and unqualified; there is no indication that it is linked to the major political parties or that its gross power is affected by their actions. Government appears to be the equivalent of society itself.

Concluding Remarks

Apart from their stand on fluoridation itself, the informants did not evidence any uniform interest in health issues. While five were followers of natural food diets, and several were Christian Scientists[2] (the categories partly overlap), the rest showed no such background, and some said that fluoridation was their first encounter with a matter of public policy and health. This limits the adequacy of explanations that seek to account for the anti-fluoridation response as one of a connected class of hostile reactions to public health programs in general

(Marmor, Bernard, and Ottenberg, 1960). The fluoridation controversy is distinguished by its scope: unlike the attacks on the Salk vaccine, or the campaigns to banish artificially colored oranges or aluminum pots and pans, for example, the anti-fluoridation movement attracts individual leaders and considerable public support in every community where fluoridation is proposed. While it may be true that all those who are highly alarmed by mental health programs and the like are also violently opposed to fluoridation, the converse clearly does not follow.

Similarly, though the readiness to perceive fluoridation as a poisonous assault may be an index of unusual concerns about bodily integrity, it is not obviously persuasive to offer this possibility as a general explanation of opposition to fluoridation (Marmor, Bernard, and Ottenberg, 1960). Two informants in our study indicated that fluoridation carried charged personal associations (Green, 1958, p. 130), and if an effort had been made, others might have been detected. But in the absence of adequate psychological studies of individuals opposed to fluoridation, it remains an open empirical question whether there are systematic relationships between personality patterns and responses to fluoridation.

Psychodynamic interpretations of opposition to fluoridation often rest on the assumption that the poison argument represents the individual fantasies of those who assert or accept it. It is then interpreted in the same manner as a psychiatrist would translate fears of poisoning, bodily damage, and the like if they were expressed by a particular person. This assumption is highly questionable. It is an essential fact that the poison argument is shared among people with a common cause, and is an important element in their rhetoric.

This alone puts the assumption in question, for the significance of individual fantasy material is precisely that it expresses an individual response to reality. Virtually by definition, the apprehensions of a given person are taken to be pathological to the extent that they have no external source and persist without social support. It is the individual's stubborn insistence that the dangers he detects are real despite the failure of others to see them that marks his beliefs as distorted or delusional.

This is not the case with the poison argument. As this paper attempts to show, its plausibility to anti-fluoridation leaders is heightened by its ideological resonance. Further, it was also demonstrated that some individuals who employ the poison argument in public have only a cautious and qualified commitment to it in private. Without going into the complex issue of types and degrees of belief, it is suggested that a second source of the poison argument's plausibility is its impact in public debate. Since it does succeed in raising doubts among those who are only mildly interested in fluoridation,

this response may reinforce the belief of anti-fluoridation leaders in the poison argument, and thus act against the tendency to take it as a possibly accurate assertion rather than a demonstrated truth. There is a sense in which it is correct to say that truth is social. As Festinger, Riecken, and Schacter show (1956), the capacity of a belief to move other minds to accept it amplifies the conviction that the belief is true.

These considerations imply that it is perfectly possible for an individual to believe that fluoridation may be poisonous and to express this belief in public controversy without necessarily having unusual or atypical concerns about bodily integrity. Certainly some distinction has to be made between those who, like the cases cited earlier, appear to use the poison argument as both a metaphor for their ideological tensions and as an effective charge against fluoridation, and those who literally believe that fluoridated water will poison them. Psychodynamic interpretations would be most appropriate to the latter, and less relevant to the former.

This is not to argue against the possibility that personality factors may be crucial in the formation of opposition to fluoridation, and perhaps to its accompanying ideology as well. But to be useful, psychological explanations must be specific in statement and empirical in content, not merely deduced from first principles of psychodynamics as a consequence of overlooking the differences between individual behavior and social action.

The intent of this paper has been to show that intense opposition to fluoridation is embedded in a wider constellation of beliefs. The interpretation began with an analysis of the poison argument: Though the belief that fluoridation may be poisonous and the conviction that American society is marked by blatant moral contradictions ostensibly refer to separate sectors of reality, they structure common elements of meaning in the same form. To be poisoned is to be deceived, assaulted and weakened by an external agent. The poison argument asserts that fluoridated water is cumulatively debilitating, but it also latently labels the damage done to individual autonomy and self-esteem by a social order that is felt to be increasingly manipulative.

Similarly, the fluoridation controversy itself is a surrogate issue. As mediated through an ideological image that sees government and business arrayed against the essential ethical premises of American life, fluoridation is tagged with a contempt for individuality, and is emblematic of an ultimate aim to smother personal identity in a homogeneous mass. Opposition to fluoridation is an act of moral resistance.

While the ideological stance attributed to anti-fluoridation leaders is only illustrated by the data that have been presented, a study of the national anti-fluoridation movement shows the same mixture of medical and moral objections to fluoridation, and a similarly drastic ideological appraisal of American society (Green, 1958, pp. 9-24, 128-29). Further, Gamson (1961-62) has found that while those who simply vote against

fluoridation do not explicitly offer ideological reasons, nevertheless many appear to feel buffeted by the same concerns that stimulate the anti-fluoridation leaders to more articulate reactions.

More generally, the argument that the fluoridation controversy is generated by ideological tensions finds common ground with other studies of puzzlingly inflamed political responses that have recently occurred in America (see, for example, the essays in Bell, 1955). The industrial dynamism that is celebrated as America's mission has, as its other aspect, the pulsating pressure of social change that is at once an outcome and a cause of "the rootlessness and heterogeneity of American life, and above all, of its peculiar scramble for status and its peculiar search for personal identity" (Hofstadter in Bell, 1955, pp. 41-42).

The direction of change has accelerated towards an increasing density of impersonal organizations, a removal of the sources of power from intimate view, and a toweringly complex social order that may be comprehended only in outline, if at all. To some, this is a fact of life, a loss that is often not felt, muted by other satisfactions. To others who hold a stringent individualism at the core of their identity, or have seen their aspirations unfulfilled, the process of change is intensely troubling, inducing a mood of despair and estrangement, and an urge to recover by striking out at the agents of discontent. Opposition to fluoridation mirrors such a mood, and exemplifies a type of political action that is best understood as symbolic gesture.

NOTES

The research reported here is part of a continuing study of the fluoridation issue by the Social Science Program of the Harvard School of Public Health. The present paper is a revised version of the final chapter of a longer report by the author (Green, 1958). The cooperation of the informants and their willingness to accept the interviewers' assurances that their opinions would be listened to with respect is gratefully acknowledged. I would like to thank Christopher Boehm, Clifford and Hildred Geertz, and Judith Singer for critically reading various drafts of this manuscript, and Peggy Golde for suggesting some substantive changes. I am also indebted to Jean L. Briggs for her help at several stages of the study, and to Charles R. Griffith, with whom I shared the task of conducting the interviews.

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A Signpost for Research on Fluoridation Conflicts: The Concept of Relative Deprivation

Arnold Simmel

All social phenomena may be looked upon from a number of different points of view. The determinants of the point of view may lie in the history of the problem, the academic background of the observer, the social context in which the matter is being studied or in the intrinsic characteristics of the phenomenon. The bizarreness of some of the arguments about fluoridation has encouraged a tendency to give explanations in terms of psychopathology. Research done in the context of governmental agencies has veered from this tendency and focused upon larger social units since those constitute more likely targets for influences by official agencies. Academic research, in particular that of the Social Science Program at the Harvard School of Public Health, has cut by far the widest swath through the many factors influencing the progress and outcome of a community decision on fluoridation.

Some Types of Explanation

It has been suggested that the variety of themes characterizing the extremist opposition to fluoridation may constitute an integrated entity, the "naturalist attitude syndrome" (Davis, 1959-60). Its manifestations include the concern with poison and purity, the natural, the unnatural and the artificial; deceitfulness and conspiracy; Americanism and Communism; both fear and adulation of authority. Conceptual unification of disparate elements is often useful, but it should be noted that a concept is not an explanation of the indicators used in its specification. Purely conceptual manipulation is rarely explanation; subsuming many specific observations under a single concept may induce the false security of name magic.

No doubt, as Gamson has pointed out (1960), among those who subscribe to the naturalist attitude syndrome a disproportionately large number are likely to oppose fluoridation, but it seems doubtful

that the naturalist attitude syndrome as a whole is very widely distributed throughout the population. Thus, it is not a good explanation for the relatively widespread opposition to fluoridation. Even if the naturalist attitude syndrome could account for a considerable fraction of the opposition, it is only an attitudinal correlate, without a social or psychological mechanism relating this "explanation" to more general hypotheses.

Quite a different type of explanation is commonly offered by fluoridation proponents: the opposition is said to be uninformed and the conclusion is drawn that the lack of information results in the acceptance of misinformation about fluoridation. While opponents of fluoridation apparently are relatively uninformed, not only in regard to fluoridation but also in regard to other matters (Simmel, 1961), one cannot account for particular beliefs by pointing to ignorance of other particular facts. Even if one believes that nature abhors a vacuum and that, therefore, *not* knowing about a particular thing makes a person gullible in regard to it, the question still remains why particular pieces of misinformation are accepted.

Another version of the ignorance hypothesis is that opposition to fluoridation flourishes where understanding of scientific and statistical method is lacking. Indeed it has been suggested (Mausner, 1957) that greater dissemination of knowledge about scientific method and statistics would eliminate a large part of the opposition. This argument seems unduly rationalistic. The propaganda in opposition to fluoridation makes only a superficial appeal to reason; primarily, it rouses the passions. In discussions with well educated people one is often struck by their hesitations in regard to fluoridation. These hesitations reflect sympathy with the emotions that prompt some of the opposition arguments, not with the arguments themselves. Thus the remark by a person with a Ph.D.: "I'd love to oppose fluoridation just to oppose something for a change. These days you have to be responsible all the time! But I suppose I have to be in favor of it, if it's good for the kids' teeth." There is no question of rationality here. One feeling is being subdued by another: a yearning for anarchy by a sense of obligation to be responsible. The subject of feelings, a speciality of the field of psychology, leads to a third explanation of the opposition to fluoridation.

In one of the most imaginative papers published on this subject, three psychiatrists, Marmor, Bernard, and Ottenberg (1960), make the point that the "appeal to reason fails so often precisely because the popular anxieties which have been aroused have an *irrational and unconscious source.*" The concern of these authors is not exclusively with the opposition to fluoridation but with "group opposition to health programs" in general. The concern with health is seen as part of the subterranean complex of needs for survival, security, mastery,

of defenses against bodily disintegration and death. These links to the basic needs and fears of personality certainly constitute one set of sufficient conditions for the violence of the feelings opponents express toward various health programs.

But it should be recognized that the opposition to health programs is often correlated with opposition to quite different programs —to school consolidation proposals, school bond issues, change to a manager form of government. Though the psychological explanation may be equally applicable in each instance, it becomes clear that other levels of explanation, not purely psychological, may be worth investigating. Neither the sociologist nor the administrator is concerned with intra-psychic phenomena *per se*. The problem that Marmor, Bernard, and Ottenberg lead up to but do not touch is exactly the problem that interests us here: what are the social conditions which activate these psychological mechanisms in opponents of fluoridation?

The Deprivation Hypothesis

We cannot do without psychology, but we can reduce it to a minimum. Zetterberg (1957) has suggested that two axioms suffice as the basis of a theory of motivation for the social psychology of situations where the fulfillment of basic biological needs is not so inadequate as to induce pathology—that is, where people are not starving or freezing, nor exposed to immediate threats of such privation. These axioms may be stated as follows: (1) people act so as to maximize their self-esteem, that is, to maximize the frequency of favorable self-evaluations; (2) when favorable evaluations come from neither the social environment nor from internal dispositions, the defense mechanisms provide a means for restructuring the world as it is experienced (i.e., the cognitive field) so that self-esteem may be maintained or enhanced.

In line with this theory, the first attempt to explain behavior should be to inquire how a person's actions contribute to his self-esteem. ("Action" must be interpreted in the broadest sense to include representational action—thought, perception, valuation—as well as performances; and dispositions as well as directly observable activities.) Sometimes observed behavior is more easily understood if it is construed as an attempt to maintain self-esteem by indirect means: by distortions of perception and displacement of feelings, by some way of finding substitute feelings or substitute descriptions of the world which are more ego-enhancing or less ego-deflating than the real situation.

To see one's own short-comings in others rather than in oneself is surely ego-enhancing. If one makes harsh judgments of one's own

aggressive impulses, one can avoid this self criticism by projecting these impulses on others, making those others appear, perhaps, as poisoners or perverters. In defense against such phantoms one may become disproportionately interested in purity. In general, the theory of defense mechanism can make the extremists' opposition to fluoridation appear to have a much higher degree of coherence. If defense mechanisms are employed in this way by opponents of fluoridation, the next step is to look for blockages to ego-enhancing action, since such blockages are assumed to make these indirect means of maintaining self-esteem a necessity, or at least a common occurrence. These blockages may be sought in the individual personality, in history, in the present social situation, or elsewhere. Here the present social situation is chosen as the focus of inquiry.

The social situation always enters into the discussion of human action in two ways. First, there is the situation as it is seen by "disinterested normal observers." Second, there is the situation as defined by the person for whom it presents the conditions within which he acts. This definition of the situation is heavily influenced by personal goals and feelings as well as by the more pervasive social norms and values from which perceptions can be made independent only by diligent effort. Social norms and values clearly play an important role in defining a situation as gratifying or frustrating.

The particular determinant of frustration central to our discussion is the deprivation which individuals feel when they compare themselves to others who are seen as having more of the valued gratifications. As in the publication (Stouffer et al., 1949) which introduced the concept, the sense of "relative deprivation" is inferred from empirical data which indicate that one category of people is disadvantaged relative to another, and that the relatively disadvantaged are likely to compare themselves to the relatively favored. The hypothesis proposed here is that *opposition to fluoridation is likely to be concentrated in categories of people who have a sense of deprivation relative to some reference group.* Fundamentally, the deprivations may always be interpreted as deprivations of prestige or insults to the self-esteem. But whereas the psychologist emphasizes deeper layers of motivation, we must go in the opposite direction, seeking data at a level closer to direct observation.

The Data

Opinion surveys were conducted in two communities which were in the process of deciding whether to fluoridate their water supplies. In "Welltown," a city of fifteen thousand inhabitants, interviews were conducted with 261 people of voting age (78% of the target sample of 333) seven weeks before a primary election, at which an unof-

ficial referendum on fluoridation was narrowly defeated 1278 to 1265. In "Brushtown" (population 80,000), where the city council made the decision not to fluoridate, our data are taken from 501 personal interviews. (Caution must be exercised in generalizing from these data since a high non-response rate, 38%, impairs the representativeness of the sample.)

The fact that fluoridation was the focus of the interview was not likely to escape respondents, although questions about other health matters made plausible the claim that the survey was concerned with a variety of health questions.

In Welltown, respondents were asked whether fluoridation was an important problem, whether it was of general interest to them, whether people were sufficiently aware of the importance of this problem, whether average citizens or community leaders can do anything about it, and whether they were for or against it. In Brushtown, respondents were asked, in regard to fluoridation, "why this is done" before being asked their opinion about it.

In Brushtown, 44% were either undecided or had insufficient information to venture an opinion. In Welltown, which held a referendum, only 33% were in these categories. Of those who had an opinion on fluoridation, 63% in Brushtown and 57% in Welltown favored it.

Test of the Deprivation Hypothesis

We will consider data on four types of deprivation: economic, prestige, and political deprivation, as well as deprivation due to rank disequilibrium.

Economic deprivation. The most common notion of deprivation refers to economic matters. Income is clearly not the only economic determinant of a person's self-esteem, but in our society it plays an important role. The general opinion that richer people tend to favor fluoridation, and poorer people are more likely to oppose fluoridation is supported by the data from Welltown and Brushtown. Controlling for education does not eliminate the relation of opinion on fluoridation to income. On the contrary, in Brushtown, where the relationship in the total sample is rather weak, it appears in somewhat stronger relief when high school graduates and non-graduates are considered separately.

It is noteworthy that the differences in Welltown are much larger than in Brushtown. Recall that Welltown has a population of 15,000 while Brushtown has 80,000 people. It may be that in large cities the actual range and dispersion of incomes is greater than in a smaller community. But two circumstances would seem to make the deprivation of low income status greater in a smaller community. First, the smaller the community, the greater the mutual visibility of its in-

habitants; hence the greater the visibility of differences; hence the greater the frequency of unfavorable self-evaluations by those who feel deprived relative to some others in the community. But the larger the community, the more likely it is that there are homogeneous subcommunities, within which visibility is high but between which visibility is very low. In large cities, there are frequently economically homogeneous areas, containing their own social and political life. The inhabitants of these areas may have little contact with inhabitants of other sections. In such an area, feelings of economic deprivation should be minimized since economic differences are less visible. The converse of this argument is that at the boundaries between different internally homogeneous areas, there should be maximum occasion for a sense of deprivation to develop, and this seems a very plausible proposition in view of the social disorganization in such marginal areas.

TABLE 1
INCOME AND FLUORIDATION OPINION

	Under $3000	$3000 to $4999	$5000 to $6999	Over $7000
Welltown				
In favor of fluoridation	29%	46%	73%	70%
Number of cases[a]	28	41	56	43
Brushtown				
In favor of fluoridation	52%	67%	71%	68%
Number of cases[a]	61	78	59	44

Welltown[b]: p (χ^2, 3 df, ≥ 20.36) $< .001$
Brushtown[b]: p (χ^2, 3 df, ≥ 5.26) $< .16$
Combining all those over $3000 in Brushtown, p ($\chi^2$, 1 df, ≥ 4.45) $< .02$[c]

[a] In this and in subsequent tables, percentages are based on those with a definite opinion on fluoridation.

[b] Because of deficiencies in the samples, "statistically significant" in this paper means no more than "of such size as would be considered significant in the corresponding probability model."

[c] Since the hypotheses tested indicate the direction of the expected differences, chi-square tests of significance are tacitly combined with a sign test wherever appropriate, with a consequent halving of the significance level in tests on fourfold tables. This procedure is sometimes called, incorrectly, a "one-sided" chi-square test. This usage is not in accord with the well-established terminology of statistics, and is here avoided.

These considerations are mentioned here because they may explain the lack of correlation between income and opinion on fluoridation found by Lindberg (1960) in a precinct in Cambridge, Massachusetts. Indeed, a number of the correlations found in Welltown and Brushtown did not become manifest in Cambridge. Lindberg's explanation of this difference is essentially that given above.

Another indicator of a sense of economic deprivation is available

from the data in Welltown: respondents were asked how their incomes had changed over the past ten years. It was anticipated that those whose income had decreased would feel a sense of deprivation. Indeed, as Table 2 indicates, those who claimed that their income had decreased *were* considerably less favorable to fluoridation than those who claimed that their income had increased. In their opinion on

TABLE 2
FLUORIDATION OPINION BY INCOME CHANGE

	Present Income in Relation to Income ten years ago		
	Higher	About same	Lower
Welltown			
Percent in favor of fluoridation	62%	47%	41%
Number of cases	125	15	29

Combining those with "about the same income" and those of lower income: P (χ^2, 1 df, $\geqslant 4.16$) $< .03$[a]

[a] Combined chi-square and sign test.

fluoridation, those whose income had remained constant were more like those whose income had decreased than like those whose income had increased. The number claiming that their income had not changed is too small to give this finding much weight. But if it were generally true, that those with unchanging income resemble those with a decreasing one, this could be accounted for by the deprivation hypothesis. Since average family income has increased considerably during the past ten years, those whose income did not increase may feel as economically deprived as those whose income decreased.

Prestige deprivation. Even in less other-directed societies than our own, prestige has a bearing on self-esteem. Styles of life or levels of living are indicators associated with common notions of prestige. An interviewer's estimate of the value of the respondent's dwelling and its upkeep, the furnishings, and the respondent's taste, was found to be highly correlated with a favorable opinion on fluoridation. Taking only respondents with an opinion on fluoridation, of those in Welltown rated by the interviewer as highest on style and standard of life, 76% favored fluoridation; of those rated in the middle, 56%; of those rated in the lowest group, 38% favored fluoridation ($p < .001$).

Occupational rank is probably the most important source of prestige. There is a difficulty, however, in knowing the occupational reference group for an individual. Does a tool and die maker compare himself to a dishwasher or to a physician? One plausible hypothesis is that white collar workers compare themselves with white collar workers, blue collar workers with blue collar workers, and relatively

few comparisons are made between these two groups. Thus, a clerk or his wife will use professionals rather than laborers for comparison but a foreman or craftsman will use an unskilled laborer for comparison. This explanation was developed, *ex post facto*, to explain the results of Table 3. Craftsmen and foremen, who are normally thought

TABLE 3
OCCUPATION OF MAIN EARNER AND OPINION ON FLUORIDATION

	Occupation of Main Earner			
	Prof. & Tech[a] A	Clerical & Sales B	Craftsman & Foreman C	Service & Laborer D
Welltown:				
In favor of fluoridation	75%	47%	62%	43%
Number of cases	52	34	37	42
Brushtown:				
In favor of fluoridation	77%	62%	70%	54%
Number of cases	70	47	43	100

Welltown:

P (χ^2, comparing A and B $\geqslant 5.85$) $< .01$[b]
P (χ^2, comparing C and D $\geqslant 2.21$) $< .07$[b]
P (χ^2, comparing B and C $\geqslant 1.08$) $> .25$ (not significant)

Brushtown:

P (χ^2, comparing A and B $\geqslant 2.54$) $< .06$[b]
P (χ^2, comparing C and D $\geqslant 2.46$) $< .06$[b]
P (χ^2, comparing B and C $\geqslant .33$) $> .5$ (not significant)

[a] Includes professionals, technical workers, managers, officials and proprietors.
[b] Combined chi-square and sign test.

of as ranking below clerical and sales people in occupational prestige are slightly more likely to favor fluoridation (p = n.s.). It is an interesting sidelight of this table that most of the variance is accounted for by the women in the sample. This is consistent with the frequent observation that women are the main carriers of social rank.

The plausible explanation that occupation is related to fluoridation opinion primarily through education is definitely contradicted by the data. Respondents in the highest ranked occupational categories are far more favorable to fluoridation than the lowest, irrespective of whether they have graduated from high school. The lower white collar and upper blue collar workers again are intermediate in their opinion, irrespective of education, though differences between them are not quite consistent.

Political deprivation. In his monograph *Community Conflict*, Coleman (1957) implied that groups opposing fluoridation often are staging a revolt against the community's administration. Strictly speaking,

this is very unlikely since administrations rarely are the proponents of this measure. But in a somewhat looser sense, Coleman may be right if it can be shown that opposition to fluoridation is an expression of dissatisfaction on the part of citizens who feel that they are left out of community decision-making. This would not necessarily imply dissatisfaction with the community government (although it might); instead, it may simply imply a sense of deprivation of political power relative to others in the community.

Some of the groups which tend to support fluoridation are seen as having, and sometimes actually have, a good deal of influence over the course of community decisions. The Chamber of Commerce and the Jaycees, the medical society and the parent-teacher associations unquestionably have some power. They and other organizations like them, or perhaps even more vaguely the compact middle class majority which they symbolize, may very well be the focus of hostility. Relative to their membership—relative especially to their leadership—one may easily feel politically powerless.

Our respondents were asked to agree or disagree with three items from a scale of "political efficacy" constructed at the Michigan Survey Research Center (Campbell, Gurin, and Miller, 1954):

> "People like me don't have any say about what the government does."
> "Public officials don't care what people like me think."
> "Sometimes politics and government is so complicated that a person like me cannot really understand what is going on."

In neither of our samples did these three questions satisfy any of the common criteria of scalability as a cumulative scale. Nevertheless, a simple index of the three questions was constructed. Table 4 indicates that the index is related to opinion on fluoridation as anticipated: those with a lower feeling of political efficacy are more opposed to fluoridation.

TABLE 4
FLUORIDATION OPINION BY SENSE OF POLITICAL EFFICACY

	Political Efficacy			
	High	High Middle	Low Middle	Low
Welltown:				
In favor of fluoridation	67%	60%	42%	41%
Number of cases	58	65	31	22
Brushtown:				
In favor of fluoridation	76%	59%	56%	55%
Number of cases	79	103	57	42

Welltown: P (χ^2, 3 df, ≥ 7.85) $< .03$[a]
Brushtown: P (χ^2, 3 df, ≥ 8.68) $< .02$

[a] Combined chi-square and sign test.

Some confirmation of these findings is gained from questions asked in Welltown about various problems which were currently given much publicity. If a respondent claimed that he considered one of these problems very important or of general interest to him, he was asked whether the average citizen could do anything about it. Considering only those who had an opinion on fluoridation, 45 (or 75%) out of the 60 respondents who felt that the average citizen could do something about air pollution favored fluoridation; only 6 (or 40%) of the 15 people who felt the average citizen could do nothing about it, favored fluoridation ($p < .02$). Similarly, of the 120 who felt the possibility of being personally effective in regard to the problem of floods, 64% favored fluoridation, while of the 34 who did not have this feeling, only 41% favored fluoridation ($p < .02$). There was no correlation between opinion on fluoridation and feelings on the possibility of effective action regarding radioactive fallout.

Rank disequilibrium. One of the problems of a pluralistic society is that people may, and often do, hold statuses which are widely divergent in terms of their social valuation. One can be highly educated but poor. Men in a high-ranking occupation may belong to an ethnic group of low rank. Women may be more successful in business than their husbands. Persons in such situations of rank disequilibrium tend to choose their reference groups on the basis of the higher statuses they hold. It may be expected that the deprivations associated with the lower ranking statuses are particularly painful for them. Unfortunately, such effects are difficult to document. Two examples are given, not for their convincing clarity, but rather to illustrate what would seem on theoretical grounds to be a promising tack.

Education may be assumed to arouse expectations about one's consumption status. Highly educated people with a relatively poor consumption status may be expected to be relatively hostile to fluoridation. In Welltown, the interviewer's rating of the respondent's level of living is strongly correlated with opinion on fluoridation. Do those with more education but with a low level of living feel especially frustrated? Of the ten high school graduates rated low in their level of living, only two favored fluoridation. Despite the small numbers involved, these differences are statistically significant ($p < .01$).

Educational level and social life are not only correlated, but at each educational level the type and extent of social life engaged in are controlled by social norms. Since the more highly educated tend to belong to a larger number of clubs or other organizations, the highly educated *not* belonging to any organization might very well feel especially deprived. In Welltown, the data are consistent with this expectation, and again it is the women who are entirely responsible for the difference ($p < .05$). In Brushtown no such difference was observed.

Organizational membership is sometimes taken as a measure of social isolation, which is a form of deprivation, though one only indirectly related to the relative deprivation hypothesis. The data show a tendency for those belonging to three or more organizations to be more favorable to fluoridation. In Welltown, of the "joiners" who belong to three or more organizations, 65% favor fluoridation, but of the "relatively isolated" who belong to fewer, if any, organizations, only 54% favor fluoridation ($p < .07$). In Brushtown this tendency is more pronounced: 78% of the "joiners" are in favor of fluoridation, but only 59% of the "relatively isolated" ($p < .01$).

Conclusion

The general pattern of results confirms the hypothesis that some sense of deprivation is being expressed through opposition to fluoridation. The process by which the hostility gets channelled in this way still requires illumination. Indeed, while the notion of relative deprivation does contribute to our understanding of the social determination of opinion, the present study has not been carried to the point where the deprivation mechanism is part of a dynamic model of community decision-making or conflict over fluoridation.

NOTE

The paper is based on research carried out under the direction of the Bureau of Dental Health, New York State Department of Health, and was supported by a grant from the National Institutes of Health (D-712). It is a revised version of a paper presented at the American Psychological Association meetings, September, 1960, as part of a symposium on Social and Psychological Phenomena Related to the Acceptance of Community Water Fluoridation.

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Science and Fluoridation: An Attitude Study

John P. Kirscht and Andie L. Knutson

One line of research and discussion of fluoridation has dealt with the beliefs of those taking a position on the issue (e.g., the Mausners, 1955; Helson and Matthews, 1959; Plaut, 1959; M. Davis, 1959-60. The search for relationships to other beliefs stems from the point of view that the reaction to fluoridation can be better understood by finding out the content of related beliefs. The apparent rejection of the scientific support for fluoridation by many people has been a continuing theme in the fluoridation literature. Opposition to the measure was characterized as "anti-scientific" by the Mausners (1955). That the Helson and Matthews study did not support the Mausners' interpretation left the nature of the relationship between beliefs about science and about fluoridation unsettled. Further research on this problem seems both worthwhile and timely. There is concern today with the impact of science on society and its relationship to public questions in many diverse areas: mental health, space research, the control of cancer and so on. How do beliefs about science affect public response to programs based on research findings?

Point of View

A survey of public attitudes toward science (R. Davis, 1958) provided a starting point for the study reported here. The primary purpose of the present study was to analyze attitudes toward science into several component areas and to relate these to beliefs about fluoridation. Davis' study (1958) found very favorable general reactions to science and scientific effort but also found some "concern about the bad, indirect effects of science: as an 'underlying theme'" (p. 221). If science is strongly supported, what is the basis for opposition to scientifically based programs? What is the relationship of reservations about scientific work to the position taken on the fluoridation issue? These are questions which our study tried to explore.

It is possible that attitudes toward fluoridation are more or less structured by pre-existing attitudes toward science, but this seems

unlikely in view of the fact that, in response to questions about fluoridation, very few people make any reference to scientific arguments. It seems more plausible that the two sets of beliefs may be interrelated as part of more general attitudes (or values). Thus beliefs about science may be related to the fluoridation issue but not in a direct way. Davis' results suggested that it might be useful to analyze beliefs about science into component themes to see if position on fluoridation was related to reservations about scientific endeavor. For the purposes of the study, attitudes regarding science were broken down into the perceived general effect of science, the relationship of science to other value areas and several specific consequences of scientific work, including indirect negative consequences.

Method and Sample

Interviews were conducted with a stratified area sample of 217 adults in Berkeley, California; 106 men and 111 women were included. The interviewing was carried out prior to a fluoridation referendum in randomly selected voting precincts throughout the city.

An interview was constructed to include questions about the various areas of science as well as questions on fluoridation. First, an open-end question about the overall evaluation of science was asked ("Would you say the world is better off or worse off because of science?"), followed by questions asking the respondent to specify the good and bad effects of science as he saw them. Second, there was a series of agree-disagree items concerning the effects of science and scientists (see R. Davis, 1958, pp. 186 ff), plus a number of choice questions, each with a science alternative and an alternative made up to represent one of the Allport-Vernon-Lindzey value areas (e.g., "Which of the following will ultimately prove more important for mankind: laboratories or churches?"). In addition, each respondent was asked what he thought about the fluoridation issue.

On the basis of the response to the question about fluoridation, the respondents were categorized as pro, anti, undecided and unfamiliar with the issue. The pro-fluoridation (65 respondents or 30% of the total) and anti-fluoridation (50 or 23% of the total) groups are of primary interest here. However, those unfamiliar with the issue turned out to be an interesting group for some comparisons; included in this group were 39 people (18%).

For the analysis of the questions on science, categories were constructed to represent the several aspects of science mentioned above. In classifying the respondents on their overall attitudes toward science, the sample was divided into those who saw the world as "better off" because of science and those who were doubtful about the effects of

science, ranging from ambivalence to outright rejection of science. Specific good and bad effects of science mentioned by the respondents were coded into a set of categories much like those used in the science survey (Davis, 1958). These categories are of interest primarily as an indication of the kind of content associated with the evaluation of science.

Four indices were derived from the responses to the fixed-alternative items in the interview. One index of five items reflected concern with indirect negative consequences of science (e.g., "The growth of science means that a few people could control our lives."). A second index of four items centered around the perceived "helpfulness" of science ("Science will solve social problems like crime and mental illness."). From the items involving choice between a science alternative and another value area, two different scores were derived: one was based on four two-choice items and one based on two items in which four value alternatives were ranked by the respondent. For each of these sets of items, a score was derived for the respondent by summing the number of choices made in a favorable or unfavorable direction.

Results

Most of the people interviewed (83%) said that the world was better off because of science. Among the 17% with doubts about the efficacy of science there was unequal distribution in position on fluoridation; the anti-fluoridation group was significantly more likely than the pro-fluoridation group to express an unfavorable evaluation of science. However, as a group, the antis were generally favorable (76%) but the pro group was much more favorable (92%); the pro group was also more favorable than those who said they were unfamiliar with the fluoridation issue. These differences have limited significance for understanding responses to fluoridation because of the generally favorable level of response to science.

When asked about the specific good effects of science, there was, for the sample as a whole, a good deal of emphasis on improvements in health, medical advances and longevity; one or more of these effects was mentioned by 61% of the respondents. Fewer mentioned improvement in the standard of living and solutions to technical and practical problems. Although 18% of the sample could think of no specific bad effects of science, nearly half pointed to war and weapons of destruction. In second place, concern about the possible misuse of science and about changes in religious beliefs, overemphasis on science and loss of human values were mentioned.

Those with unfavorable evaluations of science in general supported their attitude by describing specific bad effects; nearly 28%

of this group could think of no specific *good* effects but health and medicine still were the most frequently mentioned good effect. From the analysis of the bad effects mentioned by this group, they appear relatively more concerned about decline in religious beliefs, loss of

TABLE 1
SELECTED RESULTS ON ATTITUDES TOWARD SCIENCE

	Position on fluoridation		
	Pro	Anti	Unfamiliar
N =	65	50	39
Over-all evaluation of science			
Favorable	92%	76%	72%
Unfavorable	8%	24%	28%
Good effects of science, percent mentioning:			
Health related effects	74%	62%	44%
Solutions to practical problems	41%	32%	31%
Bad effects of science, percent mentioning:			
War related effects	51%	56%	28%
Change in values	12%	22%	7%

Mean Index scores[a]			Favorable to Science[b]	
	Pro	Anti	Pro	Anti
A. Indirect Threat (range: 0–5)	1.25	2.20	1.10	1.88
B. Helpfulness of science (range 0–4)	0.99	1.34	0.95	1.11
C. Value of science (choice items; range: 0–4)	1.80	2.10	1.80	1.79
D. Value of science (ranked items; range: 2–8)	4.18	4.78	4.07	4.47

[a] Higher scores indicate less favorable science attitudes.

[b] Includes only those classed as "favorable" in their overall evaluation of science: 60 pro-fluoridation and 38 anti-fluoridation respondents.

humanizing values, overemphasis on science and the creation of new problems such as over-population by science. These were some of the comments made: "People used to be happier and live better"; "Man's progress in science has taken him farther and farther from his natural state"; "Man is trying to take over what the Lord should be doing"; "People are not ready for science: the ends of the earth have been brought too close together."

Among those responding favorably to the general evaluative question, the pro and anti-fluoridation groupings gave a very similar pattern of response when talking about the good and bad effects of

science although the anti respondents appeared to show somewhat more concern about changes in value and harmful byproducts of science. Even though the responses of those unfamiliar with fluoridation resembled the anti-fluoridation group when asked about their general evaluation of science, the former had much less to say about specific good and bad effects. In fact, when asked to describe good and bad effects of science 44% of the unfamiliar group could think of no specific bad effects while only 8% of the anti group mentioned none.

It seemed quite possible that those with generally unfavorable attitudes toward science might have social characteristics which mark them off from the rest of the sample. This group did have less education than the rest of the sample; for example, 31% had less than high school training as against 9% among the other respondents. However, this difference is mostly attributable to a sub-group of respondents with a low level of education and no knowledge of fluoridation. Among the pro and anti-fluoridation people with unfavorable science attitudes, the amount of education, on the average, did not differ from that of their counterparts with favorable science attitudes.

The pro and anti-fluoridation groups were compared on the four indices made up from the fixed alternative items in the interview. On the first of these, labelled the "indirect threat of science," the anti group showed a significantly greater degree of threat.[1] Similarly, the antis scored lower on the items grouped together to represent the "helpfulness of science."[2] On the first "value" index, made up of two-choice items, the pro-fluoridation group tended to choose the science alternative more often but the difference was not statistically significant.[3] However, on the two ranking questions, the average rank given to the science alternatives by the pro-fluoridation group was significantly higher.[4] Thus, there is the suggestion that the relative standing of science as a value is less among those holding anti-fluoridation attitudes. As a means of measuring values, of course, this method is quite limited.

Separate analysis was made of these four indices comparing the group indicating unfavorable general attitudes toward science with those holding favorable attitudes. The problem here is whether the difference between pros and antis on fluoridation holds within the group which is favorable to science. It was found that those who were unfavorable in their response to the overall effect of science were also significantly higher on the threat index and lower on the value of

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[1] These comparisons were made by means of t-tests. On the threat index, the difference between the means of the pro and anti groups yielded a t of 3.79 with 113 df, $p < .01$. (See Table 1.)

[2] $t = 2.03$, 113 df, $p < .05$.

[3] $t = 1.35$, 113 df, $p < .20$.

[4] $t = 2.08$, 113 df, $p < .05$.

science index than the favorable group. This finding utilized the entire sample and seemed to confirm the impression gained from the specific bad effects mentioned by those with unfavorable attitudes. That is, what seems to mark off those who think that the world is worse off because of science is a concern with more indirect consequences and with values other than science.

Does this description apply to those who oppose fluoridation but who are favorable to science in general? When the scores on the four sets of items are compared for the pro- and anti-fluoridation groups, excluding those classed as unfavorable to science, a significant difference still remains for the "threat" scores but not for the other indices. In this comparison of pros and antis on fluoridation, only respondents with a favorable evaluation of science were included. To this extent, the "threat" measure indicates that the anti-fluoridation group tends to share beliefs about science with those who see certain negative consequences as salient in evaluating science.

Discussion

The results of this study indicate that attitudes toward science are related to individuals' beliefs about the fluoridation issue. Those supporting fluoridation differ somewhat from those opposing it in their general evaluation of the effects of science, but the relationship is far from perfect. Comments made by respondents about the good and bad effects of science were not only quite similar among the various groupings but also very much like the findings of the science survey (Davis, 1958). These comments indicated that the group unfavorable to science seemed to focus more on negative consequences of an indirect, evaluative nature, but still recognized and accepted the same kind of good effects as the group favorable to science. Both groups brought out concern with the direct possibilities for war and destruction. Although differences in education may be a factor here, they do not mark off the "pessimists" as such, except for a relatively uneducated group who were not aware of the fluoridation issue.

In spite of the crudeness of the measures made up from the fixed alternative items in the interview, these indices discriminated the group responding favorably to science from those responding unfavorably. This information gave an indication of the beliefs associated with the evaluation of science. What characterized the unfavorable group was not so much the things science does (many of these are good) but rather its diffuse, unanticipated consequences plus the overemphasis put on scientific endeavor. This characterization is suggestive but needs further research.

The attempt to describe those people who take a position on fluoridation would stop here and remain a minority account except

for two things. First, those unfamiliar with fluoridation were as unfavorable toward science as the anti-fluoridation group but did not show the same degree of crystallization or verbalization in describing their beliefs. The antis seemed to express more content about both good and bad effects of science. Furthermore, the index of the threat of science differentiated pro and anti groups even among those favorable to science which supports a view that outlook on science falls along a continuum related generally to the fluoridation issue.

What is it about the fluoridation issue that relates to science? Do the antis reject the scientific support for fluoridation because it doesn't take account of their fears? While this explanation is possible, it is overly rational: the research on fluoridation would hardly make a best seller. Even so, many antis accept the effect of fluoridation on the teeth but reject the conclusion that it should be put into the water supply. Both sets of beliefs, science and fluoridation, probably relate to more general attitudes.

The explanation suggested here is that general attitudes set the interpretive framework for the fluoridation issue. Values precede the content of particular issues and form a primary frame of reference within which more specific frameworks are articulated (Hastorf and Knutson, 1949). Attitudes toward science would thus exist within the framework and relate to the fluoridation issue. Beliefs about fluoridation as such may include very little scientific content yet be related to attitudes about particular aspects of science where both touch upon values. The question of the effectiveness of fluoridation and the scientific research on the problem may be either bypassed or relegated to secondary consideration.

This is a content-oriented explanation and needs to be integrated with the many other findings on fluoridation controversies. Presumably, there would be opportunity for the expression of similar attitudes on many different specific issues. Are such attitudes related to response sets in general? Do similar considerations apply to attitudes on mental health, vivisection, cancer programs and so on? Is there a general *anti* attitude or a response set to oppose new and different things? From our limited data, it is not possible to describe adequately the nature of people's value systems or their origins and communalities across community groupings. The extension to other issues would provide critical opportunities to work out this type of explanation.

NOTE

This study was done as part of the Behavioral Science Project at the University of California School of Public Health (Berkeley). This project is supported by the Russell Sage Foundation.

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The Health Professional and the Fluoridadation Issue: A Case of Role Conflict

Harry M. Raulet

When the fluoridation issue arises in a community, local members of the health profession—physicians, dentists and public health officials—tend to become involved. Especially when the issue is to be decided by referendum, these professionals find themselves playing two potentially conflicting roles. In an issue concerning health, such as fluoridation, they are expected to participate as professional experts both by their colleagues and by laymen. At the same time, they are in the position of acting as partisan lobbyists on an issue which, by the simple fact of its being subject to decision by referendum, is defined by the community as controversial and political. In cases in which the campaign to fluoridate the local water supply is carried by a partisan group made up mainly of health professionals, it seems especially likely that the professional-expert role and the partisan role will conflict sharply. This paper will examine some of the implications of the role conflict experienced by health professionals.

Sources of Data

For the study reported here, two Massachusetts cities, referred to henceforth as "Westhill" and "Orchard City," were selected in September, 1959, when reports indicated that referenda on fluoridation were likely to be held in November. (Since 1958, a Massachusetts statute has required that the decision to fluoridate local water supplies must be made by referendum.)

Field work was conducted at intervals from the third week in September through the first week in December, 1959. Focused interviews were conducted with 33 informants in the two communities in their offices or homes. Most of these people were partisans on the issue, but a few were less committed. Six informants, including the leaders of the proponent partisan groups in Westhill and Orchard City, were interviewed several times in the weeks immediately before and after the referenda. Interviews averaged about an hour in length.

The majority of the informants were either proponent-partisans

or sympathizers with the proponent side. In part, this resulted from difficulties in locating local opponents in Westhill and Orchard City, in the early stages of the study. In these communities the fluoridation proposal was not officially placed on the ballot until October (in Westhill, two weeks before election day) and the anti-fluoridationists did not engage in extensive activities until after this time. In addition, in Westhill, and to a lesser extent in Orchard City, the anti-fluoridationists reacted to me as if I were a member of the proponent side because of my Harvard and Public Health labels. In some cases, they refused to be interviewed or tended to be guarded about giving information. On the other hand, the proponents, particularly the public health officers, tended to regard me as a member of their in-group.

The fact that I followed events in the campaign as they occurred and interviewed some informants repeatedly yielded a fairly clear impression of the effects of events in the controversy on the attitudes and behavior of the participants. Informants had little opportunity to rationalize behavior retrospectively and to distort the perspective and relative weight of events.

Westhill and Orchard City are industrial communities, the former having a population of about 50,000 and the latter about 25,000. In both cases the fluoridation proposal was defeated, in Westhill by a margin of almost 3 to 1, and in Orchard City by the narrow margin of about 2 per cent.

The Partisan Groups

Let us turn first to the question of the composition of the partisan groups and their relationship to the rest of the community. In both cities the fluoridation cause was championed by a small partisan group consisting primarily of the local health officer (a part-time official with an extensive private practice in both cases)[1] and a few dentists and physicians. The majority of the communities' physicians and dentists refrained from active participation in the campaign, but they gave an almost unanimous public endorsement to the proposal. In neither city did a local physician or dentist work actively and openly against the fluoridation proposal, but the proponents, very much concerned with professional solidarity in the matter, were quite bitter toward their few colleagues who refused to sign the endorsement.

The local anti-fluoridation partisan groups were dominated by

[1] Public health officials would seem to differ from local physicians and dentists as far as the role characteristics dealt with in this paper are concerned. The rationale for classifying them together is that the health officers seemed to be more closely identified with private practice than with their public health positions; moreover the proponent groups in which they participated, especially in the case of Westhill, were dominated by private practitioners.

persons who were not influential in other community affairs or organizations and who had not played a leadership role in other community issues. In both cities the campaign of the local anti-fluoridationists was to a large extent directed by regional leaders of the opposition to fluoridation. These outsiders contributed literature and advice, and the burden of speaking on the opposition side at public meetings was carried by a physician from Boston and a dentist from Worcester, both of whom are active in fluoridation controversies in other New England communities. In Orchard City, no active opposition to fluoridation existed until outsiders came into the community about six months before the referendum was held and engaged in recruiting activities. In Westhill, there had been fairly intensive controversy over the fluoridation issue in the early fifties (without reaching the point of decision) and some of the anti-fluoridation partisans in the 1959 referendum were carry-overs from among those who had become opponents in the earlier cycle.

In both cities, established community agencies (except for the health departments) and influential individuals, including politicians, remained largely disengaged from the controversy. Members of the two opposing partisan groups had few common organizational or social ties, a circumstance which, as James Coleman has suggested (Coleman, 1957, pp. 9-14), is probably conducive to rapid and extreme polarization of sides and lack of moderation once the conflict is underway.

Dimensions of the Issue

A brief examination of some of the dimensions of the fluoridation issue will perhaps throw some light on this situation.[2] First, fluoridation is a highly unique, as opposed to recurrent, issue from the standpoint of any given community. The community tends to lack constituted agencies and institutionalized procedures for handling unique issues. Leadership tends to be emergent rather than being drawn from established organizations which have developed channels of influence and communication and access to resources. In terms of formal organizational goals, the fluoridation proposal in local communities would seem to fall within the direct purview of only the local health department. The dentists and physicians of the community are implicated in a somewhat different way, i.e., in terms of their own and their professional organizations' more or less ideological commitment to public health progress and health education. (Conceivably, a case could be made for the fluoridation issue being within the scope

[2] We have utilized the general discussion of issue dimensions found in Barth and Johnson, 1959, pp. 29-32.

of some voluntary organizations concerned with health, but speaking empirically, the latter seem to be little involved.) Opposition to the fluoridation proposal is not likely to emerge from the formal organizational goals of any established community agencies, with the possible exception of the Christian Scientists and medical fringe groups such as chiropractors.

This brings us to the dimension of saliency considered from the standpoint of the leadership and the community public. As the foregoing suggests, it may be expected that local leaders in all sectors, except the public health departments and the medical-dental sectors, will tend to perceive the fluoridation proposal as having low saliency with regard to their own goals (organizational, power, etc.). On the other hand, it may be assumed that leaders will generally perceive fluoridation as having a high or potentially high saliency for the community public because of the health and safety content of the issue (or possibly because of its value content). Instead of attempting to handle the issue through established influence structures, informal or formal, as would be the case if the issue were salient to them, leaders will tend to throw the issue back to the public for decision. The influence flow tends to be from below to above. Consequently, the fluoridation issue is frequently left for decision by referendum, even where this is not required by statute. Leaders in the political sector often assert that they will not take a stand without a mandate from their constituency; only political outsiders are likely to take a definite stand where the extent of popular opposition or approval is unknown.

The foregoing analysis of the dimensions of the fluoridation issue suggests that the makeup of the partisan groups and their relationship to the rest of the community in Westhill and Orchard City were not purely fortuitous. Hence, it is likely that the conditions which underlay the professional role conflict to be described in this paper are sometimes present in other communities where the fluoridation issue arises.[3] In any event, in both communities studied, the proponent partisan groups were made up almost exclusively of health professionals; the opponents were predominantly non-influentials and their campaigns were directed by the regional anti-fluoridation leadership.

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[3] We would not necessarily expect this analysis to apply to large metropolitan centers where there are likely to be public health personnel with experience and sophistication in the politics of fluoridation and where members of the regional or national anti-fluoridation leadership may reside. A typology of communities, classified in accordance with characteristics affecting the shape of fluoridation controversies, would be useful. Thus, fluoridation controversies in New England towns may differ systematically from those in cities. When the issue is discussed in the context of the community the antis may place more emphasis on the value content of the issue and less on the "scare tactics" used in mass distribution leaflets.

Leaders from various institutional sectors of the community remained largely disengaged from the conflict.

The Course of Events

In both Westhill and Orchard City the proponents attempted to present their campaigns primarily in the form of health education programs. Since health education is part of the traditional role of physicians, dentists and public health officials, it appeared to them as an appropriate way to deal with a medical issue like fluoridation. In both communities, the proponents wanted their campaigns to be "quiet" ones involving very limited last-minute mass propaganda activities, few attempts to involve various community agencies in the issue and, particularly, the avoidance of public debate with opposition elements. At the beginning of their campaigns the proponents believed that there was no strong local opposition. But, feeling that the fluoridation issue was potentially salient to the community public, they hoped that by limiting their activities they would avoid stirring up opposition and being drawn into public debate. The proponents' view of fluoridation as properly a medical and scientific issue, rather than a political one, made them reluctant to involve agencies and individuals over whom they, the professionals, would not have close control. Proponents felt that to engage in public debate would imply that fluoridation is a political issue on which expert professional opinion is no more privileged than lay opinion or, in the case of debate with anti-fluoridation physicians and dentists, that a scientifically respectable opposition exists.

In the absence of plans for extensive propaganda activities, the proponents maintained their optimism about the outcome by making certain assumptions about the probable reactions of the electorate. It was assumed that many blank ballots would be cast on the fluoridation proposal, but that of those who would vote on it, middle class and upper class elements, relatively easy to reach and influence with the health education program, would be over-represented. In Westhill the proponents also relied heavily on a political gimmick which consisted of plans for a last-minute extensive telephone campaign by a group of women who had been extremely helpful in electing the incumbent mayor two years previously. As we shall see, this stratagem proved to be unsuccessful.

The proponents of the fluoridation proposal in both communities found themselves caught in a dilemma. The referendum context of decision-making, as we have stated, defined the issue for the public as a controversial one and one in which all the voters had an equal right to an opinion. In this context the proponents' health education campaign approach was often seen as arrogant and undemocratic

behavior. In accordance with the norms governing the referendum context, many laymen apparently felt no obligation to acknowledge the professional expertise of the proponents. In addition, as partisans in a referendum contest, the proponents were often assimilated to the image of ordinary lobby groups.[4] As lobby groups the proponents were suspected of acting in accordance with material self-interests or, occasionally, as espousing a set of values to which they were asking the community to commit itself and not as disinterested professional experts. These characterizations were not suitable from the standpoint of physicians, dentists and public health officials of the proponent side. When such intentions were attributed to them during the course of the campaign they reacted negatively and strengthened their resolve to present their campaign as health education and to avoid public debate.

In this way the approach of the proponents played neatly into the hands of the anti-fluoridationists. The activities that the health professionals defined as part of a health education campaign were redefined by the opponents, in the context of the political discourse of the referenda, as arrogant attempts to suppress anti-fluoridation information and arguments and as violation of the norms of democratic fair play. This created an atmosphere in which further accusations about the motives and intentions of the proponents could be plausibly made. The accusations included charges of collusion between the medical profession and public health officials on the one hand and the chemical industries which manufacture fluorides on the other. The local health professionals were in general depicted as a captive group who, because of fear of such sanctions as expulsion from their professional organizations, had to act in the fluoridation issue in accordance with the dictates of their higher officials. These accusations tend to be part of the standard campaign equipment of the anti-fluoridationists, but the point made here is that the structure of the conflicts created an atmosphere in which the accusations were sustained and taken more or less seriously by many people in the communities who were unfamiliar with the politics of fluoridation.

Illustrations

Let me illustrate some of these points more concretely. In Westhill the proponents had taken steps to line up the support of the leader of the mayor's telephone group, and this group was expected to carry on a mass telephone campaign just prior to election day. The pro-

[4] It should be added that in taking a position in such issues as health insurance, the AMA may help to establish an image of itself as a lobby group which carries over to the local physicians and dentists who are involved in fluoridation controversies.

ponents planned to refrain from the use of other mass propaganda techniques, although the local newspaper in favor of the fluoridation proposal gave them some editorial support. During the weeks preceding the election, several organizations including the Parent-Teachers Association and the League of Women Voters, tried to set up forums at which pros and cons of the issue could be debated. The proponents were in the embarrassing position of turning down these offers. Many who were sympathetic to the proponent cause but not actual members of the partisan group were bewildered by this apparent high-handedness and evasiveness. The proponents quarreled with some pro-fluoridation housewives, who, puzzled by the tactics of the health professionals, attempted on their own to debate the issue publicly with the opposition. The persistent refusal of the proponents to accept invitations to forums led to a quarrel with the League of Women Voters, and the newspaper of one neighboring town carried a story stating that a League of Women Voters' forum on fluoridation had to be cancelled because no official (health officer) or private pro-fluoridationist would agree to speak. One education meeting for the public was held by the proponents at a local school and broadcast on the local radio station, and here they ruled that all questions from the audience had to be either submitted in writing or phoned in. The pastor of a local Unitarian Church organized a speaking program for the anti-fluoridationists (also broadcast) on the grounds that they were not being given a chance to present their case.

Many were left with the impression that not only were the professional proponents acting arrogantly but that they were also attempting to suppress the presentation of the anti-fluoridation side. The anti-fluoridation partisan group engaged in a mass leaflet campaign and accused the proponents of conspiratorial intentions and the rift between the two sides widened. The mayor along with other local politicians, was unwilling to identify himself publicly with the fluoridation issue, and he had a falling out with the leader of the telephone group. Because of this the proposed telephone campaign collapsed and the proponents were left without adequate means of reaching the electorate with their case.

The campaign of professional fluoridation proponents in Orchard City consisted primarily of a series of health education programs held at meetings of Parent-Teachers Associations and other local organizations, although they did use somewhat more mass propaganda techniques than their counterparts in Westhill. Their attempt to organize an education program for a meeting of the League of Women Voters led them inadvertently into a public debate with the opposition, but they turned down other invitations to participate in forums on the issue. The anti-fluoridationists took advantage of the proponents'

reluctance to engage in debate and accused the physicians and dentists of being involved in a conspiracy. One of the public meetings scheduled by the Orchard City anti-fluoridation partisan groups was cancelled when the City Hall janitor failed to appear to unlock the City Hall annex which had been reserved for the meeting. Accusations were made that the proponents, particularly the health officer whose office is located at the City Hall, had engineered this "lockout." The anti-fluoridationists also angrily accused the proponents of undemocratic procedures when the latter prevented the distribution of anti-fluoridation leaflets at their various education meetings. The anti-fluoridationists continued this theme at the League of Women Voters' forum where they publicly accused the proponents of rigging the forum by insisting upon time limitations on the debate and on questions from the audience. The impact of the debate on the audience seemed to confirm the proponents' most pessimistic anticipations. The lay audience seemed to have no clear-cut means of deciding on the relative validity of the technical arguments of the two sides. But when the proponents gave heavy emphasis to the fact that their position is supported by reputable and authoritative professional organizations such as the Medical and Dental Associations and the U.S. Public Health Service, the opponents rather effectively countered that this constituted an admission that the local professionals were acting as a captive group carrying out the will of these organizations.

In Orchard City the disputation between the two partisan groups and the accusations made by the anti-fluoridationists were not brought to the attention of the community to the same extent as in Westhill. However, it will be remembered that when the fluoridation proposal was first initiated in Orchard City there were no local people committed to the anti-fluoridation side; regional leaders came into the community and attempted to interest a few individuals in the issue. The image of the professional proponents as undemocratic tacticians helped to make confirmed anti-fluoridationists out of people who were at first only partially committed and it facilitated the recruitment of some other hard-working antis in the course of the campaign.

Coleman has suggested that it is generally the marginal men, those who are not heavily identified with the community and are not subject to the cross pressures felt by existing leaders, who are likely to be unconstrained and irresponsible in community conflicts. The anti-fluoridationist partisans in the communities studied approach the status of marginal men in Coleman's sense (Coleman, 1957, p. 12). The local physicians, dentists and public health officials could be expected, in terms of Coleman's view, to be normally more concerned with keeping the dispute within bounds and on a principled and dignified level. But when the proponents' strategy involves the avoidance of public debate and the appearance of keeping back informa-

tion from the public, they find themselves in the position of the irresponsible partisans who are violating the community norms of fair political play and widening the breach between sides. This in turn functions as justification for extreme action on the part of the antis and provides a setting for suspicion regarding the intentions and motivations of the professional proponents.

Summary

Let me summarize the main points in the discussion of professional role conflict in fluoridation referenda. (1) The medical-dental proponents, in prosecuting their campaign, tend to present themselves in the manner of professional men engaged in health education of the community public. (2) The behavior and intentions appropriate to the roles of health professionals contrast sharply with the behavior and intentions expected of partisans in referenda contests. (3) The proponents find that their intentions are impugned and that their claims to authoritativeness are often unacknowledged. (4) In reacting to this, the proponents' inclination to enact their professional roles is reinforced, particularly their partiality for a quiet educational campaign which avoids public debate. (5) In consequence the proponents are vulnerable to charges of campaigning in a one-sided undemocratic manner and of suppressing the other side of the issue. (6) This provides a setting in which the community gives credence to antis' charges that the local doctors and dentists are involved in conspiracies against the public welfare.

It was apparent to the observer that the health professionals in Westhill and Orchard City simultaneously occupied two positions involving incompatible expectations but the extent to which they themselves were explicitly aware of this varied from individual to individual.[5] For example, the Orchard City health commissioner, in referring to a controversial post-election letter which he had written to the local newspaper, stated that he had acted as a health officer and physician and not as a politician, as many people mistakenly assumed. At the opposite extreme, a dentist-partisan of fluoridation in Westhill, whom I interviewed after the fluoridation proposal had been overwhelmingly defeated, said the following:

> It is hard for us to understand how people can question what we say when it is our life work. But they really don't mean to say, "I won't believe you on fluoridation." Instead, they are really saying "I'm not the one to handle

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[5] In this paper I have not followed the definition of some writers who restrict the concept "role conflict" to cases in which the actors themselves perceive that they are subject to contradictory expectations. (Gross, Mason, McEachern, 1958, pp. 244-246.)

this fluoridation problem—it is the business of doctors and dentists." The man in the street is aware that fluoridation is up to the doctors and dentists and the public health people.

An explicit awareness of the role dilemma confronting professionals who campaigned on a medical issue in a referendum context escaped this dentist as it did many of the other participants. There was a tendency for the proponents to react to their dilemma by strongly reaffirming that they were acting strictly as professionals and to refuse to acknowledge the fact that in the campaign the public also viewed them as lobbyists and politicians.

NOTE

This study is part of the continuing research activity on community aspects of the fluoridation issue conducted by the Social Science Program of the Harvard School of Public Health. The paper is a revised version of one presented to the American Psychological Association meetings, September, 1960, at the symposium on Social and Psychological Phenomena Related to the Acceptance of Community Water Fluoridation.

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The Stages of a Community Controversy: The Case of Fluoridation

Irwin T. Sanders

Pressing problems of the day involve controversy. Such controversies are not resolved by a majestic sweep of the pen or by using the laws of logic; they are related to fields of action where many complex variables come into play. To deal with a field of action in other than literary ways one must devise paradigms of social action and find statistical means to deal with the variables shown to be present in either a theoretical or pragmatic approach.

Fluoridation, though not necessarily the most important problem of our time, is a good case in point. The national government, through the United States Public Health Service, has given whole-hearted endorsement to the fluoridation of public water supplies, as have the American Medical Association and the American Dental Association. Thus, on the national level the decision has been made affirmatively. Although it is favorably received in some places, in many communities throughout America fluoridation is being defeated when put up for public vote or when acted upon by city councils. This would indicate that the fluoridation issue must be viewed with reference to local or community spheres of action and not only in terms of the national sphere. Closer examination of many other, perhaps "more basic," decisions of national scope might show that they, too, have strong local roots. Case studies of particular communities usually emphasize the uniqueness of each community and the particular way its residents deal with a decision such as fluoridation. However, cross-community comparisons require the development of a conceptual approach, simple enough to make use of the unique data and yet sophisticated enough to assist in the formulation of hypotheses for further testing.

One approach which has proven useful in connection with fluoridation is that of viewing controversy in any community as passing through a series of *stages*, leading up to a community decision. When the issue comes to the community forefront again, as fluoridation frequently does, these same stages repeat in a second or third *sequence*. Available models of social action which trace the

accomplishment of a community objective (such as building a hospital) from start to finish are not pointed sufficiently in the direction of controversy to be altogether serviceable. The stages represented here were developed to deal essentially with issues which are controversial in nature.

The Stages Illustrated

Although the terms used for the six proposed stages are largely self-explanatory, a glance at the outline of actual events in the town of "Surfside" (one of ten Massachusetts towns studied after they had reached decisions on fluoridation) will help illustrate use of the terms:

Initiation. Mr. Burton, Superintendent of Water and Sewer Department, suggested to Dr. Vance, head of school dental clinic, that the town initiate fluoridation. These two consulted officials of the Massachusetts Department of Health, who sent literature which Burton and Vance studied.

Preproposal. Burton presented the idea of fluoridation to the water commissioners, who gave only perfunctory approval. Burton and Vance arranged for a panel of speakers at a PTA meeting; small audience; no objections. The proposal was prepared as an article for the next town warrant by Burton and Vance, although it was not clear whether it was officially sponsored by the Water and Sewer Board or the Board of Health.

Proposal. Article that town water be fluoridated appeared on the town warrant in advance of town meeting, indicating that it was to be a matter for town business.

Community action. The first sign of opposition after the proposal was published, was a letter by a dentist, Dr. Ames, to the *Surfside Gazette.* The Finance Committee discussed it at a committee meeting but took no action. The powerful Taxpayers' Association, which regularly meets before town meeting, withheld support. Dr. Grayson, a young physician, presented the Taxpayers' position against fluoridation. Those putting the proposal on the warrant did little to promote favorable action.

Decision. Article was decisively defeated in town meeting.

Aftermath. Dr. Grayson, who played a crucial role in defeating the measure, thinks that if the issue came up again he would support it for he was actually urging a "go slow" policy.

For many communities the single sequence described for Surfside is not sufficient. Often matters do not rest with the first decision; new proposals about fluoridation are put forth for community action, thus starting a new sequence.

The Stages Defined

What are the distinguishing characteristics of each stage? Although no absolutely water-tight or fool-proof scheme can be drawn up for such complex phenomena as community controversies, a useful approximation can be described in terms of at least two sociological criteria for each stage.

Initiation. By definition we limit the initiation stage to that activity where (1) the initiator is seeking primary group support, and (2) the idea is still in the discussion stage. Such a characterization tends to delimit the initiation stage to a much narrower scope than is sometimes accorded it, but the limitation is both logical and verifiable. When the initiator is talking to those he knows on a face-to-face basis, and when these individuals mention the matter to their friends and colleagues, then the action is still being "initiated." This does not exclude the discussion of the matter in an official body or organization if the initiator happens to be a member of that body (a part of the in-group) and wishes to sound out his associates informally.

A second characteristic of the initiation stage is that it includes only discussion and "sounding out." Should the primary group begin to work out the details of a proposal or formulate a campaign, the action then moves into the preproposal stage, even though secondary groups have not been contacted.

In looking into the participation of principals in fluoridation controversies that took place in ten Massachusetts towns, we have found that in a given community three or four people may consider themselves the initiators of the fluoridation issue, for they discussed the idea with their own set of friends some time in the past. Later on, when some other person moved the issue to the preproposal stage, these early idea men assumed that it was their discussion that led to the new development. They may or may not have been given what they considered to be due credit, a fact which subsequently affected the enthusiasm of their support.

It is also quite clear that many ideas, whether for fluoridation or other community measures, never go beyond the initiation stage. People talk about them informally, sometimes quite excitedly, but let the matter drop there. Later on, the issue may be raised again by the same people or by others who this time generate enough momentum to start the preproposal activity.

Preproposal stage. As already indicated, the initiation stage ends and the preproposal stage begins when those involved go beyond their primary groups and start making secondary contact. They call upon personages important to their cause but unknown to them on an intimate basis—newspaper editors, town or city officials, organi-

zational leaders, and professional people with career involvement in the issue. This preproposal stage is also reached when the initiators continue their discussion, but this time not to test their idea so much as to formulate a plan of action. At this point, they have developed a sense of commitment; they have decided to go ahead, at least to the extent of taking up the matter with secondary contacts whose approval is needed for a successful outcome. Strategy begins with (1) the decision as to what supporters are to call upon what personages and with (2) the agreement as to what they are to say and not say. Thus, a "pro" side has come into existence, with its self-conscious backers who may not yet be classed as partisans. It should be noted that the "pro" side may be the one seeking to throw out fluoridation, which is already in force. The "pro" here refers to the fact that support is being sought for a proposal to do something of community-wide significance.

At this stage open opposition may appear. In the initiation stage, some of the people with whom the idea was discussed may have been dubious or even antagonistic but the primary group relationship may have tempered their comments or they may not have sought a community-wide forum. But in the second stage, the opposition may become much more vocal. It faces the difficulty, however, that since the proposal has not been clearly formulated, it must argue against an idea or an incipient issue and not a concrete statement. At the same time, the proponents can now take the rising opposition into account and develop a program which may soften many of its objections when the proposal is at last formally before the community.

The opposition may spring from many sources. At the meeting of a Kiwanis Club in one of the towns studied, a proponent spoke on behalf of fluoridation so effectively that a member rose to move that the Club immediately endorse and help promote this measure (still in the preproposal stage). Immediately, one or two members who were steadfastly opposed to fluoridation rose to object. The motion was withdrawn, and pro and con sides began to form almost at once within the Kiwanis Club.

The preproposal stage may continue over a fairly long period of time if the proponents consider it advisable to carry out an "educational program" before they bring up the issue for decision. During this stage the proponents are making many secondary contacts, marshalling what they hope is support, working out their strategy and tactics, and making the final decision on the proposal to be presented. Their opponents may be doing much the same, for in one sense the issue may already have been raised in the community at large; but the proponents have not yet made the final move for legitimation of their measure.

The proposal. This is the formal move for legitimation. The supporters conform to whatever requirements are necessary to bring forth a decision by those with authority to dispose of the measure. In the case of the ten towns in our sample an article on the town warrant was considered the proposal, since the town meeting itself (with one exception) was the legitimizing body. More recent legislation in Massachusetts makes a referendum mandatory for adopting fluoridation, thereby requiring the favorable vote of the electorate as the legitimizing act.

The two prerequisites for this stage are (1) formal presentation and (2) necessity of action by the legitimizing body. In the formal presentation enough specific details are provided so that both the proponents and opponents know exactly what measure is proposed: it may be creation of a study committee, adoption of fluoridation, or holding a referendum, although in the legal terminology of the warrant the statement is phrased in neutral terms.

In other states where city councils can take effective action, the proposal would be presented to them. To arrive at this point, certain preliminary steps may have been necessary in the preproposal period, such as getting the approval and recommendation of the Board (or Department) of Health, or a statement of estimated costs from the city engineer. Unless the proposal is presented in the proper manner, so as to call for action, the issue has not yet moved into the proposal stage.

The tactics of proposal presentation may have much to do with the outcome of the issue. Such tactics involve the selection of "the right people" as official sponsors, the timing so as not to run into conflict with some other issue that would drain away support, the sensing of general community readiness to act favorably upon the proposal, and the interpretation given to the community at the time of presentation.

Community action. Up to this point—the presentation of the proposal before the proper legitimizing body—the issue cannot be squarely joined. There can be much argument back and forth on a number of related points, many of which in a fluoridation issue are basic points, but community pressure is not usually brought directly to bear upon the legitimizing agents (city councilors, water commissioners, voters, etc.) until the proposal has been formally lodged.

Controversy implies the existence of two conditions: (1) an opposition is active and (2) there is some general community involvement. Both of these are conditions of degree. Just how active an opposition must be to create a controversy is an unsettled point. One or two letters to the newspaper editor by the town crank, whether for or against the measure, would not in itself indicate a controversy. Certainly in a genuine controversy the legitimizing body is forced

to consider opposition arguments to the point that these or the possible political behavior of those advancing them have a bearing upon the decision. The opposition may not defeat the measure, but what they have to say is taken seriously.

On the other hand, "general community involvement" would mean that some citizen or lay behavior, as opposed to professional or official behavior, occurred. Where clubs and individuals go out of their way to take a stand pro or con, beyond the call of duty, there are indications of general community involvement. How much of the population needs to be involved and how emotionally intense this involvement needs to be cannot be settled by definition. At any rate, the decision by a small official body on behalf of what its members consider community interest, without the knowledge of others in the community, is not community involvement in the sense used here. There must be people willing to state publicly their reasons for or against the proposal and these people must have arguments or a following significant enough (by numbers, prestige, influence) to be taken into account by the legitimizing body in reaching its decision.

The decision. When a proposal is presented, a legitimizing body has four options: postponement, rejection, amendment, adoption. The appointment of a study committee or the request for an investigative report by the city or town engineer are two ways that postponement is sometimes effected. Simply to fail to put the matter on the agenda is one way of dealing with the proposal but cannot be considered a "decision" in the sense used here, for real proposals, as previously defined, cannot be long deferred in this fashion. Quite often the legitimizing body amends the proposals to take care of some of the opposition arguments and then approves it. Neither side is wholly satisfied, but the decision-makers feel that they have worked out the best possible compromise. In the case of adoption, the matter supposedly is settled, but in a fluoridation issue this may be only the prelude to another sequence of stages. Rejection, too, may not actually settle the issue since the proponents may wish to have another try as soon as legal time limits for reopening a question permit, or as soon as they think they have a good chance of winning. Our studies in ten Massachusetts communities would indicate that the decision is not necessarily "decisive" for long, which is why controversial issues must be viewed in terms of sequences as well as stages.

The sociological features of the decision stage do not relate as much to the type of decision taken as to the fact that (1) the legitimizing body acts and (2) somebody wins and somebody loses, with whatever social consequences this might have.

Aftermath. If a decision calls for execution, this would be part of the aftermath. But in the case of one town, for instance, official delay

occurred because the town officers were afraid that they might be involved in legal difficulties if they carried out the will of the town meeting. A postponement or rejection by the legitimizing body would not require execution, which is why execution cannot be considered a major stage in a community controversy, although it is an integral part of a successful community action program.

Every community decision, by its very nature, has a bearing upon subsequent treatment of issues with any relationship to the one "decided." Something of a "community memory" does seem to operate as people try to recall what was done about an issue, why it was handled as it was, and why it won or lost. Mention is also frequently made of the names of people who were issue leaders and how this activity affected their community standing. Looked at sociologically, the aftermath is characterized by the fact that (1) the losing side may or may not consider the issue settled and (2) the partisanship surrounding the issue may or may not be transferred to other community activities or interpersonal behavior.

Findings about the Fluoridation Controversy

Preliminary data gathered in several New England communities about other issues (school site, planning and zoning, property reassessment, etc.) indicate that the stages discussed in this article apply to these issues as well. Since the focus of this research, however, is on fluoridation, no attempt will be made here to illustrate the broader application of this approach. Instead, some of the findings about fluoridation will be set forth for each stage.

Initiation. The prime movers—those starting the first sequence—are those who are professionally involved (dentists, public health officers, water superintendents). If the move toward fluoridation is defeated on the first go-round, there is a tendency for the dentists to leave the matter up to the Board of Health or to specially formed citizens' action groups, who may start action in the second of third sequence of stages.

The decision reached in the first sequence may in itself be the initiating factor in a later sequence since it has provided for the report of a study committee, the preparation of a referendum, or some other community action at a later date, at which time a new proposal will be presented to the community for decision.

Those that initiate fluoridation on its scientific merits alone are usually ill-prepared for continued leadership when it becomes controversial, for they find themselves playing roles which they are not prepared to perform and which the community had not previously associated with their status of dentist, physician, or water commissioner.

Preproposal. Bona fide Study Committees, which usually function during the preproposal stage of a second or third sequence and really dig into the evidence, tend to present an endorsement of fluoridation even though the majority of the members may have been opposed in the beginning. Some organizations may start out supporting fluoridation after hearing a favorable presentation, but when the topic becomes controversial (especially in the community action stage), the organizational leaders have to choose between holding their members together or pushing through their formal stand favoring fluoridation. In such cases, most organizations will choose the former and therefore give only token or lukewarm support to fluoridation.

Since certain legal formalities have to be observed to get an article about fluoridation on the town warrant, much activity of the sponsors in the preproposal stage lies in persuading the Board of Health or the water commissioners to endorse or recommmend such a proposal. In several of the communities studied, the effort to use this period for educational purposes was minimal, for activity tended to move within professional-official circles and did not involve the "general public" except by coincidence. But some segments of "the public" did make their ideas known in no uncertain fashion.

Many supporters in the preproposal stage have little advance inkling of the controversy which is apt to break out. When a sharp issue does develop, they often become bitter toward the initiators "who got them into this mess" in the first place.

Proposal. In the cases we studied, the proposal took the form of an article in a printed town warrant circulated a short while before the Annual Town Meeting. The appearance of this warrant is frequently the call to community action on the part of those who wish to block fluoridation, although they may have been registering some informal opposition previously. The Massachusetts communities under review all have the town meeting form of government, thereby providing no variations in methods of presenting the proposal. During different sequences the preproposal might be formally pushed or presented by different sponsors such as official or quasi-official groups, the warrant often stating at whose request the article is inserted.

Community action. The key leaders of the community tend to avoid the fluoridation issue as much as they can. They rationalize that they "have more important measures to get through town meeting" or are happy to resolve their own political dilemma by "letting the people decide" in a referendum.

The period of community action may be of longer duration in the second and third sequences because the proposal may be placed before the community in such cases much further ahead of the time

of decision. This is not usually the situation when the fluoridation issue first arises in a community.

Communities vary considerably as to the frenzy shown and types of activities pursued in this stage. In some, the argument is severe but the issue quickly subsides; in others, it leaves lasting "community" scars to such a point that selectmen and others involved even find it painful to talk about the experience three or four years later. In some communities, full use is made of the organizational technique, including the creation of action groups for and against fluoridation and the effort to involve civic bodies in the controversy. Other communities rely primarily upon public debate in hearings called by official or private groups. The newspapers invariably become involved through "letters to the editor" even if they do not choose to editorialize or to carry many news items about fluoridation. The political election techniques of "getting out the vote," "lining up votes," and "creating public interest" were definitely manifested by one side or the other in the majority of our ten communities. In those second or third stages where the issue was really considered "hot" the partisans for either side were apt to utilize all of these techniques.

In general, the pro-fluoridationists make use of outside help in the initiation or preproposal stage, whereas the anti-fluoridationists rely upon outside help in the community-action stage.

Decision. Referenda generally have tended to go against fluoridation even in those communities where supporters were confident of a favorable vote. However, in those cases where water districts are not coterminous with the boundaries of the political-action unit (e.g., town) the subscribing voters seem to react more favorably to fluoridation. If this is indeed a tendency rather than a chance outcome due to few cases, it may be due to the fact that the regular political apparatus cannot readily be used by a minority to force the issue in a given direction since some of its power figures live outside the water district.

Although Massachusetts law now requires referenda for community decisions to fluoridate, several of the ten communities previously arrived at a decision through the town meeting. Our local informants indicated that in the public debate at the town meeting leading personalities in the community often played decisive roles in the issue by taking a forceful public stand; in other communities, the strategy of scheduling discussion late at night is said to have encouraged postponement and later rejection. One cannot help but be impressed by the fact that in few communities are the decisions about fluoridation final, however they are reached.

Aftermath. The losers' reactions to the outcome is a determining factor in the initiation of a new sequence. If they decide to raise the issue again, they often take steps to do so shortly after the issue has

supposedly been resolved. The anti-fluoridationists are more apt to react militantly toward an adverse decision; the pro-fluoridationists are more apt to be discouraged, disillusioned, and left without much fight. This is because many in the latter group for the first time may have been confronted with the seeming irrationality of much public behavior toward a supposedly "scientific question."

One tactic often employed is that of questioning the legality of a decision to fluoridate. Thus the anti-fluoridationists first move the issue from the scientific realm to the political realm and, if losing in the political fight, they have recourse to the legal realm. Much legal questioning comes in the "aftermath" stage.

When the fluoridation controversy has gone through only one sequence of stages in a community and where the anti-fluoridationists have not been very active, the opponents use the aftermath stage to try to convince people that the decision was not fairly arrived at (e.g., the weather was bad and old people couldn't come to the polls; the opponents of fluoridation were ruled out of order and didn't have a chance to state their case; the officials didn't give the correct information about costs and safety). If they succeed in this, then those first voting in favor may support a move for reconsideration.

Conclusion

The ten Massachusetts communities on which this study is based do not form a representative sample of any significant universe for they were selected as the research team heard that there was a fluoridation issue to be studied. Therefore, the delineation of stages suggested here may or may not be adaptable to a radically different type of local political unit and the generalizations with respect to the stages may hold true primarily for the town-meeting type of local government and for controversies which ended in defeat for the pro-fluoridationists.

What has been demonstrated, however, is the need for some kind of orderly method of breaking down the fluoridation controversy into standardized sequential units so that behavior connected with it can be described on a cross-community basis. Statistical techniques can eventually be brought into play in the analysis of a larger number of cases of community controversy representing a wide range of communities; some of the cases may be different issues arising in the same communities. Workable theories of controversial behavior formulated for the local community could have applicability to broader areas of social action and could lead to a deeper understanding of some of the momentous national and international questions which confront us. Even if one undertakes to deal directly with grand

questions in a national rather than a local framework, this undertaking would be greatly aided if it could be supported by propositions carefully tested at the community level.

NOTE

This study is part of the continuing research activity on community aspects of the fluoridation issue conducted by the Social Science Program of the Harvard School of Public Health.

Community Characteristics and Fluoridation Outcome

William A. Gamson and Peter H. Irons

In the study of a disease, epidemiology often precedes and gives clues to etiology. Similarly, in the case of community decisions on fluoridation, it seems desirable to begin by establishing the existence of gross differences among communities with differing outcomes. There has been a tendency prematurely to interpret alleged differences which lack confirmation and on which the evidence is ambiguous.

We intend to review and evaluate the available evidence on the association of various community characteristics and fluoridation outcome. We will not try to "explain" or interpret the correlations found. For example, population size will not be regarded as an index of "homogeneity" or any other variable but will be treated as a variable in its own right. We will comment on some of the implications of our findings for interpretations that have been made by others. However, our principal task is simply description of the sometimes complicated associations that exist between community characteristics and fluoridation outcome.

Individual differences should not be inferred from the association between some community characteristic and fluoridation outcome. For example, a positive association between the percentage of people over age 65 and the vote against fluoridation does not *necessarily* imply that people over 65 are voting against fluoridation. We refer here, of course, to the so-called "ecological fallacy." Individual differences will be discussed only when based on data from samples of individual voters.

Sources of Data

This paper draws on four sets of unpublished data. The nature of the data and the methodology involved in each of the four sources are as follows:

(1) Arnold Simmel, a sociologist working with the New York State Department of Health, has tabulated certain data on all the 230

communities in New York State with a population of 2500 or more. He had recorded whether or not each community has ever considered fluoridation and whether, having considered the issue, it has adopted fluoridation. The issue has been "considered" if the municipal government has officially discussed the matter, or if a motion regarding fluoridation has been presented to the municipal government, or if a referendum or official "public opinion poll" has been conducted. As of December, 1958, fluoridation had been considered in New York by 56 communities, 31 of which had adopted it. Simmel recognizes the possibility of overlooking smaller communities that have considered fluoridation but have not adopted it; attendant publicity is less likely in small communities than in large ones. As Simmel points out, this is a serious limitation on the comparisons made, especially on variables related to population size. However, we will make these comparisons in the context of other data. Information on general community characteristics is based on 1950 Census Reports. Hereafter, we will refer to this source as the *New York data.*

(2) James Coleman and Maurice Pinard of Johns Hopkins University have compiled data on 262 nationally distributed communities that have made some decision on fluoridation. Of these, 122 passed fluoridation and 140 defeated it. In addition to this information, they have the percentage voting for and against fluoridation in 135 of these communities. The vast majority of their data is based on community decisions made in 1955 or earlier so that recent trends may not be accurately reflected. Data on general community characteristics are based on 1950 Census Reports. Hereafter, we will refer to this source as the *Hopkins data.*

(3) Arnold L. Green and Jean L. Briggs (1957) of the Social Science Program, Harvard School of Public Health, compiled data on all 53 Massachusetts communities which had made a decision on fluoridation by the end of 1957. Of the 53, 27 had passed fluoridation, and 26 had decided against it, with the manner of decision varying among referenda, town meetings, and executive action. In about two-thirds of the communities, the town meeting was the forum of decision. Green and Briggs studied differences between adopting and non-adopting communities by means of a Mann-Whitney test. Their independent variables were community characteristics taken from 1950 Census Reports; when communities are ranked relative to these variables the test indicates which types of community are more likely to have a higher rank on the variable in question. No use was made of the size of the fluoridation vote in these communities. Hereafter, we will refer to this source as the *Massachusetts data.*

(4) The present authors compiled data on 64 communities in the six New England states which had recorded a public vote on fluoridation by June of 1961. While the majority of these votes involved

secret ballots, the precise manner of decision is difficult to tell from the formal record. Thus, in some communities, a secret ballot will be held after discussion at a town meeting or water district meeting; at others, it will be held as a referendum item on the ballot with state or local elections; in still others, there will be an open show of hands at a town meeting. This variation in the manner of decision is a problem with the Hopkins data as well but a less serious one since the town meeting form is peculiar to New England.

Data on community characteristics were drawn primarily from 1950 and 1960 Census Reports. The method of analysis involved product-moment correlations with partial correlations to isolate the effects of the different independent variables. In addition to this, various multiple correlations were computed, using the variables most highly related to fluoridation. Many communities in New England have held more than one vote on fluoridation with considerable fluctuation between votes. In cases of this sort, the most recent vote was used. Hereafter, we will refer to this source as the *New England data.*

As we examine each of these sources of data with respect to specific variables, it is worth recognizing that while different, they are not wholly independent sources. The New England data include many of the towns used in the Massachusetts data. The Hopkins data include some of the towns from both of these sources as well as New York communities. Thus, points of agreement among these different sources, while encouraging, should not be regarded as completely independent confirmations.

Population Size

There seems to be no clear relationship between population size and the likelihood of fluoridation winning or losing. The Massachusetts data and the New York data show no significant relationship between fluoridation action and population size in 1950. The New England data show no correlation with either 1950 or 1960 population. Similarly, the Hopkins data reveal very little relationship. There is a slight tendency in the Hopkins data for towns under 10,000 population to take more favorable action on fluoridation than do towns over 10,000. Of 158 in the former group, 51% passed fluoridation while 40% of the 100 larger towns passed it ($p < .10$).

Population size may, however, be related to fluoridation in another way. While it may be no predictor of victory or defeat, there is a hint that the closeness of the vote on fluoridation increases with the size of the community involved. A closer look at the uncorrelated New England data reveals a funneling effect with the narrow end of the funnel located among the larger cities. A comparison of the average squared deviation of the vote in towns under 10,000 in size

with those over 10,000 indicates that there is about 50% more variance among the smaller New England towns (p=n.s.). There is some indication of this funneling effect in the Hopkins data as well. Of those 44 towns in which the vote in favor of fluoridation was close (between 40% and 60%), 32% were over 25,000 in population. Of those 90 towns where the fluoridation vote tended to one extreme or the other, only 18% were over 25,000 (p=n.s.).

National statistics on fluoridation show that the larger the community the greater is the likelihood that fluoridation is in effect. The New York data strongly suggest a greater tendency for larger communities to consider the issue. Thus, this association may reflect only this tendency rather than a greater likelihood of passing fluoridation once the issue arises.

Age

There appears to be a fairly consistent inverse relationship between age and fluoridation success. The Massachusetts data indicate that those towns with the highest percentage of children under 15 years are more likely to pass fluoridation ($p < .10$). The New England data indicate a correlation of —.26 ($p < .10$) between median age in 1950 and percent in favor of fluoridation, and a correlation of —.33 between percent over 65 years of age and fluoridation vote ($p < .05$). The Hopkins data also support the general correlation with a significant relationship between percent under 15 years of age and fluoridation success ($p < .02$). In towns with less than 27% of the population under 15 years old, fluoridation won in 35% ($N = 130$); in towns with more than 27% under age 15, fluoridation won in 55% ($N = 64$).

The New York data, however, do not support the above pattern. Communities with a higher median age are *more* likely to pass fluoridation once they consider it ($p < .10$). Furthermore, among communities under 10,000 which considered fluoridation, 12 of 18 that fluoridated were among the *lowest* in percent of children under 15 years. Only 2 of 8 communities that did not fluoridate were in this group. This aberration may possibly be explained by the fact that smaller communities tend to have an older age distribution. Thus, small communities which rejected fluoridation but escaped detection because of lack of fanfare were probably higher in median age; and their inclusion would tend to nullify this aberrant result. It still seems safe to posit the existence of a modest association between the youthfulness of a community's population and the likelihood of fluoridation's success.

While the various measures of age—percent under 15, median age, and percent over 65—are all interrelated, there is some indication that the percent of people over 65 may be particularly crucial for deter-

mining the fluoridation outcome. Not only did the New England data show a higher correlation for this variable, but partial correlations indicate its independent importance. The correlation between median age and fluoridation vote is reduced virtually to zero when the percent over 65 is partialled out. However, the correlation between percent over 65 and fluoridation outcome still remains substantial (.21) when median age is controlled. Furthermore, Simmel (unpublished study) has shown through interviews of cross-section samples of two communities that the relationship between children under 19 and pro-fluoridation attitudes is eliminated when one controls for age. Within every age category except the oldest, those with children were less likely to be favorable to fluoridation (p of various differences = n.s.). Again this suggests that the presence of a large number of older people may be the most crucial aspect of a population's age distribution for the outcome of a fluoridation decision.

Education

It is a fairly standard misconception that there is a simple positive relationship between education and favorable action on fluoridation. The Massachusetts data support this view by indicating that adopting communities have a higher median education than communities which defeat fluoridation ($p < .05$). However, the New England data indicate a low *negative* correlation (—.12) between median education and percent voting in favor of fluoridation ($p =$ n.s.). This correlation becomes even more negative (although still not statistically significant) when population size, percent over 65 years old, and median family income are controlled.

It is our belief that these contradictory results can be accounted for by the existence of a non-linear correlation between education and favorable action on fluoridation. Towns with very low and very high median education may be more likely to give fluoridation a favorable vote than towns in the middle. Thus, the inclusion of towns in northern New England (Vermont, New Hampshire, and Maine) meant the inclusion of several communities with very low median education but favorable fluoridation vote.

Separating the twenty Massachusetts communities with a vote on fluoridation from the rest of the New England data, one finds a correlation of .30 ($p =$ n.s.) between median education and fluoridation vote. This result, although not significant, supports the Green and Briggs results for Massachusetts. However, given the overall negative correlation of —.12, a negative relationship in the other New England states is implied. In fact, the correlation between education and fluoridation vote for New England communities (primarily in Maine) other than Massachusetts is a fairly substantial —.42 ($p < .05$).

The Hopkins data contain no relevant information on this variable but there is some suggestion of non-linearity in the New York data. Of the ten "considering" towns with a median education under 9.5 years, 70% favored fluoridation; of 13 towns with 11.5 or more years of median education, 77% were favorable; but 55% of the 33 "considering" towns with a median education between 9.5 and 11.5 years favored fluoridation ($p = n.s.$).

Finally, not only communities that are "in-between" with respect to median education but also individuals who have a moderate amount of education seem more negatively disposed toward fluoridation. In a study of voters in Cambridge, Mass., Gamson (1961) found that "those with less than eighth grade education are strongly for fluoridation as are those with some college or more advanced education but the in-between groups are less favorable." In general, then, it seems worth abandoning the view of a simple correlation in favor of the more complicated but more tenable hypothesis of a non-linear relationship between education and fluoridation outcome.

Income

There is probably a slight tendency for wealthier communities to take more favorable action on fluoridation. The evidence is far from clear; if such a relationship exists it is apparently a very slight one. In the New England data, the percentage voting for fluoridation is correlated with both the percent with income under $2000 ($r = -.27$, $p < .05$) and with median family income ($r = .26$, $p < .05$).

Beyond this point, things became more clouded. The percent over 65 years of age partially accounts for these relationships although there is still a correlation of —.20 between the percent under $2000 and favorable fluoridation vote when the percent over 65 is partialled out. The Massachusetts data show no correlation between median income and favorable action on fluoridation although there is a hint that both the richest and the poorest communities tend to *defeat* fluoridation. To confuse matters further, the New York data also show no significant relationship between median income and action on fluoridation but contain the suggestion that the richest and poorest communities are more likely to *pass* fluoridation. There is no evidence in the Hopkins data on this variable.

What all this adds up to is somewhat uncertain. Wealthier communities are probably slightly more likely to pass fluoridation but it is extremely doubtful that there is any direct causal connection here. Communities with a high percentage of people with income under $2000 a year are also likely to have a high percentage of people over 65 years of age (the New England data showed a correlation of .33 between these variables). The clearer pattern of evidence regarding

age and fluoridation action suggests that age is a more crucial variable than wealth.

Population Growth

Communities experiencing rapid growth appear to be slightly more likely to take favorable action on fluoridation than more stable communities. The Massachusetts data show that communities adopting fluoridation are growing more rapidly ($p < .10$). Similarly, the New England data show a correlation of .20 ($p = .12$) between population increase from 1950 to 1960 and percentage voting in favor of fluoridation.

The Hopkins data show no relationship between growth and fluoridation outcome. However, there is a relationship between rapid growth and closeness of the fluoridation vote. Only about one-third of communities which had a growth rate of 30% or higher between 1940 and 1950 had a one-sided vote on fluoridation; over three-fifths of communities growing 15% or less during that time period voted in one extreme or the other on fluoridation ($p < .05$). The New York data show no significant association between growth rate and action on fluoridation.

Growth rate is, of course, associated with other characteristics. Many such communities are suburbs with a high percentage of young people, a low percentage of people over 65 years and few with incomes under $2000. Thus, the low correlations that exist may well be due to other variables.

Rossi (1957) has suggested that fluoridation controversies can be viewed as an expression of "the malaise of the older residents in communities experiencing rapid growth." This would seem to suggest a negative correlation between population growth and percentage in favor of fluoridation. There may be greater resentment by older residents in such communities, but such people are being greatly outnumbered by newcomers in many places. Ten year growth rates of better than 100% are not uncommon in many towns. Communities of stable population are not insulated from the various social changes occurring about them and these may be more important sources of "malaise" than any generated by "oldtimer-newcomer" rivalry in the growing communities.

Other Variables

The studies under discussion examined other variables in addition to the five discussed above. The Massachusetts data showed no relationship between percent voting Democratic in the presidential election of 1956 and action on fluoridation. The New England data

did show a correlation of —.44 between percent voting Democratic in 1952 and percent in favor of fluoridation ($p < .10$) but this comparison covered only 20 Massachusetts communities. The included communities with the highest Democratic percentage tended to be those with a considerable number of low income and older people—characteristics which tend to be associated with a low vote for fluoridation.

The Hopkins data examined regional differences and the effect of the size of the voting turnout on fluoridation outcome. Except for a few regional differences and the rather unsurprising association between a high turnout and a close vote, nothing of significance emerged. No relationship was found between percent of labor force in manufacture or percent unemployed in 1950 and fluoridation outcome in either the Hopkins data or the New England data.

Simmel classified the New York communities by whether they did or did not have a manager form of government. An unusually clear cut difference emerged: 85% of the communities with a manager had considered fluoridation in contrast to 52% of the others. Of those that had considered fluoridation, 68% of the manager-governed communities had decided in favor of fluoridation, only 26% of the others had.

Conclusion

In general, the relationship between the different variables examined and outcome on fluoridation has been quite weak. At best, something in the vicinity of 10% of the variance in fluoridation vote in New England is accounted for by any single variable. One might ask how much variance a combination of two or more such independent variables could "explain." Only the New England data are in a form which allows a relatively easy answer to this question. The highest multiple correlation using two variables combines percent of population over 65 years old and percent with income under $2000. The correlation of .38 with vote on fluoridation still accounts for less than 15% of the variance.

It is possible that none of these studies has chosen the "right" variables to relate to fluoridation. Perhaps there is some untested population characteristic with a higher predictive value for fluoridation outcome. We doubt it. Radical shifts in vote on different occasions in the same community are fairly common. Yet community characteristics scarcely change in such a short time period. A more likely hypothesis is that specific events occurring within a community are more crucial determinants of fluoridation outcome than any relatively fixed attribute such as median age or education. This does not mean that the outcome of such controversies is essentially idiosyncratic

and defies prediction. In all likelihood the events are patterned and susceptible to categorization and analysis. A systematic study in a series of communities of who does what, when and how in the course of a fluoridation controversy, appears to be a better investment of resources than a continued search for fixed demographic attributes of the community significantly associated with fluoridation outcome.

NOTE

We are very much indebted to Arnold Simmel; to James S. Coleman and Maurice Pinard; and to Arnold L. Green and Jean L. Briggs for making their data available for use in this article.

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Some Unanswered Questions and Action Implications of Social Research in Fluoridation

S. Stephen Kegeles

In 1920, a young psychiatrist, having just completed his residency, accepted a position as Chief of Service at a state mental hospital in the Rocky Mountain area. Much to his surprise, he found no patients with schizophrenia in that hospital. Over a period of time, he found no schizophrenic patients in the state where he worked or in three neighboring states. He was able, with some help from the Public Health Service, to map geographical areas in the country where schizophrenia either did not exist at all or occurred in very few cases. The question was, why are there schizophrenic patients in some parts of the country, and no schizophrenic patients in other parts of the country?

After fifteen years of investigation, the psychiatrist was able to find, in the water of communities where there was no schizophrenia, a trace element which did not exist in water supplies of communities where schizophrenia was present. This trace element was named "nomo-schizotherapia." Using very refined methods of analysis, chemists produce "nomo-schizotherapia" in two forms: a tablet, and a solution which could be added to water. Controlled research showed that "no schiz," as it became known, could reduce the occurrence of schizophrenia among children by 50% to 60% with the preventive effects lasting through adult life. No harmful side effects occurred where the proper proportions were present although mild acne resulted in some areas where "no schiz" was present in large quantities.

A psychologist with a state Mental Health Association realized that a daily routine of tablet consumption of "no schiz" could not be hoped for. He recommended to the Public Health Service that the cure and prevention of schizophrenia would be most efficiently accomplished by adjusting community water supplies to an optimal no-schiz level. The Public Health Service took the official position that "communities desiring to no-schiz their water should be strongly encouraged to do so." Shortly thereafter, national organizations

representing the social science professions independently assessed the 1000 articles that had been written on no-schiz, and stated publicly that placing no-schiz in water was a harmless, effective, and economical method for alleviating and curing schizophrenia.

However, a few physicians, two psychologists who worked in advertising, and two lay persons publicly stated that "no-schiz" was not proved, that it was poison, and that people would lose freedom of choice and develop unsightly blemishes, if no-schiz were placed in public water supplies. The five began a newspaper called the No-Schiz News. The data on no-schiz began to be questioned by lay persons. States insisted that no-schiz could not be introduced into community water supplies without a community referendum. Schizophrenia was not a contagious disease. People without potential schizophrenia were being forced to drink the water.

As time went by, it was found that three out of every four community referenda held resulted in defeat for no-schiz. Here were many schizophrenics taking up hospital space who would never have developed schizophrenia had they been able to get no-schiz. Yet interested groups seemed unable to establish a workable program for making no-schiz available to the public.

Obviously, this example of no-schiz has not occurred. However, if the social scientist can imagine his feeling of frustration if this allegory were reality, he would have some idea of the frustration of the dental public health profession at this time. The practitioner is then intimately concerned with any data obtained by social scientists which can increase his knowledge of the social process.

It is for this reason as well as the conceptual reason that the present paper will deal with (1) some practical implications of the present research, (2) some gaps in the current research, and (3) some future directions for social research in fluoridation.

Practical Implications of Social Science Research

Social scientists have investigated the fluoridation controversy using many conceptual frameworks. In varying degrees, there has been an interest in utilizing the issue as an opportunity to test the adequacy of certain sociological and psychological concepts and to understand the dynamics of the fluoridation controversy. It is reasonable to hope that some of the knowledge gained by social research, in addition to serving theoretical interests, will also have practical applications. To what extent, for instance, does the present research provide guidelines for the health practitioner?

Much of the recent research on the fluoridation issue has focused on the relation between underlying attitudes and feelings about fluoridation. Thus, Simmel and Green in this issue suggest that one's

feelings about the larger society and one's relative position in it may influence attitudes on this issue. Kirscht and Knutson point to basic attitudes toward science—particularly the indirect threat—as an important variable.

The health practitioner is unable to apply directly data which deal with such basic feelings. If a person feels alienated from his community because his job is relatively meaningless, one can hardly change the nature of industrialization in America. Yet, there remain two unanswered questions. If it is true, as research findings so far tend to indicate, that persons who state they are against fluoridation as compared to those in favor of fluoridation have greater feelings of deprivation, alienation, and political helplessness, do all these persons actually vote against fluoridation? And, if they do vote, why should fluoridation activate these feelings? One may find some implications for action in the answer to this question. Perhaps the specific actions of the leading proponents and opponents in a fluoridation campaign have the effect of mobilizing these feelings and bringing them to the fore. Thus, this line of research into the general determinants of a potential voter's behavior may offer more practical implications in the end than might appear at first.

Raulet's paper on the role conflict of the health professional in a fluoridation referendum may prove to be of particular interest to the public health dentist. Raulet has touched on one reason why the public health dentist stands in need of help. Like our hypothetical psychiatrist, the dentist asks, in effect, "Why won't people accept my professional word in this dental health matter?" However, as Galagan (1960) has noted, "One could read into Raulet's paper two kinds of approaches to community action. The health professional might stay out of the discussion entirely, giving it only his blessing and endorsement. On the other hand, one can also read into Raulet's paper a new justification for the health professional participating in the political aspects of the fluoridation fight directly and wholeheartedly."

Perhaps the way around this dilemma is to recognize that the practitioner can follow no simple rule which ignores the many differences between communities. Instead one must ask under what conditions the "detached expert" role, on the one hand, or the "professional politician" role on the other will be successful? Raulet was able to study only two communities intensively and, thus, can offer only a starting point. Yet even at this preliminary stage of research, the practitioner might take heed that an attempt to play both roles simultaneously is likely to make his actions vulnerable to opposition attack and public misunderstanding.

The formulation of stages through which community controversies must pass, presented in the paper by Sanders, has intriguing

possibilities. It seems valuable to be able to compare communities on such diverse issues as school board elections, fluoridation, and community improvement referenda. Sanders' utilization of certain stages to analyze ten communities which have made decisions on fluoridation is an attempt to test his formulation. To make his scheme of stages most relevant for the practitioner, one would need to know the consequence of taking particular actions at particular times. Thus, one might discover that pressing for a decision may help or hinder the cause, depending on the timing. For maximal use, one would also need to be able to predict the length of time each stage is likely to take in a community. Clearly, more research is called for. Sanders' conception calls attention to the existence of a process in which consequences of actions depend not only on what is done but on when it is done, as well.

Gaps in Existing Research

Existing research on fluoridation makes it clear that many unanswered questions remain. It is worth making some of these explicit.

Generality of results. Most of the research to date has been heavily concentrated in the Northeast, particularly in New England. There are many unique features of this region. Most important for the fluoridation controversy is the fact that in Massachusetts, and in one other state, referenda are mandatory prior to fluoridation. It is likely that the energies used in other states for producing a favorable executive decision on fluoridation must be used differently in Massachusetts.

A regional analysis, by the author, of national data on fluoridation referenda indicates that the acceptance rate in the South (58%) over the last dozen years is considerably higher than in other regions (44% in the Northeast, 27% in the West, and 40% in the rest of the country). Thus, the data presented in this journal represent communities from an average acceptance area, and from a very low acceptance area, but none from a high acceptance area (the South). It is clear that controversies in other areas must be studied before results can be generalized to the whole United States.

Manner of decision-making. Some communities have accepted fluoridation by executive decision; others have rejected fluoridation by executive decision; still others have left the choice to the population. How do these communities differ? On what basis were decisions made? Who made the decision? Is there a history of political schism in one rather than another kind of community? Is the locus of political power distributed differently in communities that make decisions in one rather than another way?

Comparison with other issues. Referenda are held in commu-

nities to decide many issues. How do the votes for other referenda compare with those on fluoridation? How much interest is there in fluoridation as compared with other referenda issues? Is there similar or different leadership from one kind of referendum to another?

Campaign strategy and tactics. How much effect does mass communication versus personal communication have on a vote? How early during a fluoridation campaign are individuals' decisions made? Who are the change agents for fluoridation referenda? Do rational or emotional communications produce more interest, and thereby more votes? Do successful attempts to increase the number of votes lead to more votes in favor of, or against fluoridation?[1] How can information on fluoridation be communicated in ways which do not intensify anxieties of individuals susceptible to orally threatening stimuli? All of these questions need additional delineation. Conceivably, longitudinal studies in a number of communities will produce such data.

Psychodynamics of opposition. The only published material on fluoridation which presents a psychodynamic analysis of anti-fluoridationists (Marmor, Bernard, and Ottenberg, 1960) depends on general theoretical formulation, and not on direct interview. In fact, perhaps the only data on psychodynamic patterns of anti-groups can be found in Gilbert (1947) and Lindner (1954). Unraveling the psychodynamic processes of active opponents is certainly an unmet social research need.

Connection between attitudes and votes. It seems inevitable that feelings of relative deprivation and political helplessness will occur among many people in this country. Such feelings of political helplessness may lead either to resignation and apathy or to some more active protest. One might ask why the fluoridation issue brings out such feelings, and why some people are mobilized to action against fluoridation while others are not. In their respective papers, Simmel and Green suggest why the potential is there. But some explanation seems necessary as to when, under what conditions and how: (1) people who feel relatively deprived vote for, or can be induced to vote for, change, (2) people who do not feel as deprived outvote the relatively deprived, and (3) events occur which induce the relatively deprived to consider themselves as part of the community.

Reconciliations between diversities in data. Because the data on the fluoridation issue is so scarce, it seems relevant to consider how data from one study may be reconciled to other information about fluoridation. Raulet states that because the fluoridation issue is not

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[1] A recent report by Carter and Savard (1961) on school bond referenda indicates that high turnout is inversely related to success of referenda.

salient to community leaders, "they will tend to throw the issue back to the public for decision." This occurred in the two communities studied by Raulet. Yet, in the country at large the number of communities that have decided fluoridation by referendum is a very small percentage of the number of communities where decisions on fluoridation have been made.

Raulet states that "fluoridation is a highly unique, as opposed to recurrent, issue from the standpoint of any given community"; and further that "leadership tends to be emergent rather than being drawn from established organizations. . . ." Yet, Simmel states that "opposition to health programs is often correlated with opposition to quite different programs—to school consolidation proposals, school bond issues, changes to a manager form of government." Marmor, et al. (1960) find that much of the anti-fluoridation literature stems from the same sources as anti-mental health, anti-polio vaccination, and anti-aluminum cooking pot literature. Probably all of these data are valid in certain places at certain times. Perhaps the expression of deprivation takes different form, through different leaders, for different local issues. But it seems important to ask when, where, how, under what conditions: (1) is leadership newly emergent, (2) are decisions given to the population, (3) is national literature as opposed to local literature used?

Research in Progress

The research reported in this *Journal* and the articles listed in the bibliography following Paul's review represent reported research only. Some of the questions raised above are presently being studied, and it may be in order to mention the kinds of research now in progress.

Analysis of anti-fluoridation letters. The author, jointly with Robert O'Shea, is completing an analysis of anti-fluoridation letters received over the past ten years by various members of the government. This analysis should provide an additional test of Green's argument for the symbolic nature of the poison argument.

Demographic analysis. Only the "Hopkins" data in the material analyzed by Gamson and Irons represent national coverage. A report now in preparation by the present author analyzes 583 referenda held in 509 communities between 1949 and 1960. Thirteen census variables are used as independent variables. Preliminary analysis suggests general agreement with the Gamson-Irons conclusions but some qualifications may be necessary for one or two variables. In general, the correlations appear low and support their conclusion that types of data other than demographic are demanded.

Simulation of a referendum. An attempt is being made by

Simulmatics, Incorporated, under Public Health Service sponsorship, to construct a model for the simulation of a fluoridation referendum by means of electronic computers. The hypotheses which are part of the model include findings from political theory, attitude change research, communications research, and community analysis.

Spread of fluoridation action. Elihu Katz, in connection with National Analysts, is studying various aspects of how communities affect each other's actions. Attempts are being made to study over 1100 communities to determine differences between votes on fluoridation and votes on other issues, the types of pro- and anti-fluoridation leaders and the kinds of literature which have been used in these communities. This work is also part of the research program of the Public Health Service.

Community decision-making. William A. Gamson and Benjamin D. Paul are currently pursuing a comparative study of 20 to 25 previously unstudied New England communities. In each community, two issues are examined in addition to fluoridation. Information is being collected on the operation of power and on various aspects of the social structure in an effort to understand community decision-making more generally.

Conclusion

The articles reported are a beginning of research on why fluoridation referenda have succeeded and why they have failed. They document certain occurrences, and suggest hypotheses for further study. Unfortunately for the practitioner, these reports do not yet present any clear answer on how to win a referendum. While future research will undoubtedly continue to emphasize understanding rather than action, there seems reason to be optimistic that help for the practitioner will be one of the eventual by-products.

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Biographical Sketches

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ARNOLD SIMMEL has recently completed a study of fluoridation conflicts for the New York State Department of Health. He has had graduate training in sociology and mathematical statistics at Columbia University, and has been an assistant study director at the Columbia Bureau of Applied Social Research. He has also been a lecturer at the Columbia University School of General Studies, and a teaching fellow at the Graduate School of the New School for Social Research.

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